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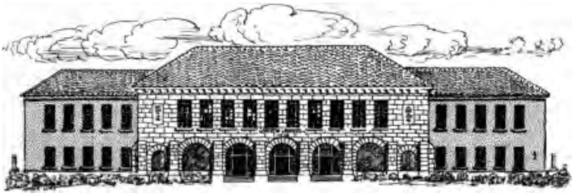

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COMPLETE GRADED ARITHMETIC

PART SECOND

FOR SIXTH, SEVENTH, AND EIGHTH GRADES

BY
GEORGE E. ATWOOD

BOSTON, U.S.A.:
D. C. HEATH & CO., PUBLISHERS.
1899.

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PREFACE.

THIS book continues the course in arithmetic begun in Part First, and contains the work for the Sixth, Seventh, and Eighth Grades. The course of study and contents show the kind and amount of work in each grade. Beginning with the Seventh Grade, the plan is slightly different from that of the preceding grades. The lessons are generally limited to one subject, although there are rarely two problems in succession involving the same principle or requiring the same solution. No effort or labor has been spared to make the work as thorough and comprehensive as that of Part First. The number and variety of problems in each subject furnish sufficient practice for the complete mastery of that subject. The work of teaching the business forms of arithmetic is not left to accident or the thoughtfulness of teachers. Pupils have frequent practice in making bills, writing receipts, all kinds of promissory notes, drafts, and indorsements, until they become perfectly familiar with all these forms. Special attention is called to the oral exercises in percentage following the work of Seventh Grade, First Term; also the exercises in simple interest following the work of Seventh Grade, Second Term. A little daily practice on this work will result in increasing power, and will train pupils not always to resort to paper and pencil in the solution of questions in arithmetic.

The work is submitted to teachers with the hope that it may lighten their labors in this department and thus supply a long-felt need.

GEORGE E. ATWOOD.

TARRYTOWN, N.Y.,
August, 1893.

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COURSE OF STUDY.

SIXTH GRADE.

1. Teach decimal fractions, federal money, and bills. Teach how to find the cost of articles bought by the 100, by the 1000, and by the ton. Pupils must be able to give without hesitation the decimals to which $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{3}{8}$, $\frac{5}{8}$, and $\frac{7}{8}$ are equal. Give careful attention to reading and writing decimals, also to multiplication and division. Frequently have pupils make out bills and receipt them as the proprietor and for the proprietor. Have them write receipts for the partial and full payment of debts. Give problems frequently in which the sum of two numbers is given and the fraction or number of times that one is of the other, to find the numbers. Constantly review previous work.

2. Denominate numbers, including reduction ascending, reduction descending, and all cases in reduction of denominate fractions. Constant review of previous work.

3. Addition, subtraction, multiplication, and division of denominate numbers. Area of rectangular surfaces, including plastering, roofing, and carpeting. Area of a rectangle and one dimension given, to find the other. Volume of rectangular solids, including the measurement of wood, stone, capacity of cisterns, etc. Volume and two dimensions given, to find the other dimension. Difference of time between dates. Board measure. Work problems.

SEVENTH GRADE.

1. Begin percentage. Teach the definitions of the five elements of percentage. Show the relation of the five elements to each other, and teach in order the five cases in percentage. Drill thoroughly on each case separately and then give several lessons consisting of miscellaneous problems in the five cases. Apply the principles of percentage in the study of profit and loss and commission. To become thorough in this work, pupils must know what element in percentage each number in the problem represents.

2. Study insurance, taxes, duties, interest, exact interest, annual interest, compound interest, problems in interest, partial payments, and review the work of the first term. Compute interest principally by the six per cent method. Give careful attention to definitions and principles, and give frequent practice in writing promissory notes.

3. Study trade discount, true discount, bank discount, exchange, and review work of preceding terms. Drill carefully in writing notes and drafts. Strive to have pupils make a clear distinction between buying a draft and remitting it to the creditor, and *drawing on* the debtor.

EIGHTH GRADE.

1. Review thoroughly the work of the seventh grade.

2. Study stocks, equation of payments, ratio and proportion, partnership, involution, and evolution.

3. Study mensuration, longitude and time, and the metric system of weights and measures.

COMPLETE GRADED ARITHMETIC.

SIXTH GRADE—FIRST TERM.

To the Teacher. — Before assigning this lesson, teach 105 . . . 117.

LESSON 1.   1. Learn 105 . . . 117.

2. Multiply $\frac{4}{11}$ by 5.   3. $9 \times \frac{11}{18}$.

4. Reduce $\frac{13}{50}$, $\frac{7}{25}$, and $\frac{17}{20}$ to decimals.

5. Reduce $\frac{2}{3}$, $\frac{10}{14}$, $\frac{8}{12}$, $\frac{3}{7}$, and $\frac{30}{35}$ to 21sts.

6. Find the sum of $7\frac{1}{2}$, $8\frac{2}{3}$, $9\frac{3}{4}$, $7\frac{5}{6}$, and $8\frac{7}{8}$.

7. Express in words .8, .19, 7.0006, and .075.

8. Find the L. C. M. of 6, 10, 15, 18, 20, and 24.

9. Reduce .7, .05, .215, and .0165 to similar decimals.

10. Reduce .25, .8, .0012, and .04 to common fractions.

11. What is the value of 858 eggs at 23 cents a dozen?

12. $960 + 84 \times 9 - (143 - 78) - (135 - 13 \times 7) \times 9$.

13. What prime numbers multiplied together will give 1072 and 1269?

14. What is the value of 45 bushels of wheat, at the rate of $2\frac{1}{2}$ bushels for \$2?

To the Teacher. — Teach 118. See notes to teacher in lessons 2 and 11, Fifth Grade, First Term.

LESSON 2. **1.** Learn 105 . . . 118.

2. Divide $\frac{45}{73}$ by 15. **3.** $64 \div \frac{8}{42}$.

4. From .423 take .01768. **5.** $78\frac{5}{6} - 49\frac{3}{4}$.

6. 581 is $\frac{7}{9}$ of what number? **7.** $4\frac{1}{2} + 5\frac{2}{3} + 7\frac{5}{6}$.

8. Reduce $\frac{1}{16}$, $\frac{7}{500}$, $\frac{6}{750}$, and $\frac{13}{250}$ to decimals.

9. Add 7.85, 48.068, 9.8, .875, 78.94, and 6.59.

10. Express in words .08, .0194, 4.0003, and .00004.

11. Reduce .054, .0008, and .875 to common fractions.

12. Reduce .3, .0004, 6.23, .007, and .1 to similar decimals.

13. Find the greatest common factor of 462, 759, and 1155.

14. How many half-inch cubes are there in a board 2 ft. long, 9 in. wide, and one inch thick?

15. How many square feet are there in the walls and ceiling of a room 17 ft. long, 14 ft. wide, and 10 ft. high?

16. How many 2-inch squares are there in a sheet of paper 8 yards long and three feet wide?

To the Teacher. — Teach 119. If it is found that pupils can do more work than is contained in the lessons for this term, assign part or all of the corresponding lessons in Fifth Grade, First Term.

LESSON 3. **1.** Learn 105 . . . 119.

2. Simplify $\frac{\frac{4}{5} \text{ of } \frac{1}{8} \text{ of } 4\frac{1}{4}}{6\frac{3}{8}}$. **3.** $7.135 \times .0043$.

4. $.00075 \times .00044$.

5. Reduce $\frac{1}{125}$, $\frac{3}{40}$, and $\frac{3}{2000}$ to decimals.

6. Simplify $\frac{5}{6} + \frac{3}{4} - \frac{1}{2} + \frac{7}{8} - \frac{5}{12} + \frac{2}{3} - \frac{7}{24}$.

7. Add 9.8, $7\frac{2}{3}$, .86, 74.4, .62, $9\frac{4}{5}$, $.43\frac{1}{3}$, and $48\frac{3}{5}$.

8. Add .465, .0046, 9.48, 68.7, 245.84, and .875.

9. Find the difference between 48.79 and .6834.

10. Reduce .28, .125, and .005 to common fractions.

11. How many times is the greatest common divisor of 48, 60, and 180 contained in their least common multiple ?

12. What part of an acre is a piece of land 5 rods long and 4 rods wide ?

13. Find the number of cubic feet of air in a room 14 ft. long, 11 ft. wide, and 9 ft. high.

To THE TEACHER. — Teach 120.

LESSON 4.

1. Learn 119 and 120.

2. Divide $10\frac{1}{8}$ by $2\frac{1}{4}$.

3. $\frac{14}{15} \div \frac{7}{5}$.

4. Divide .387 by 45.

5. $16.9 \div 1.3$.

6. Divide 73.8 by .0008.

7. 875×6.48.

8. 128 is $\frac{4}{5}$ of what number ?

9. $\$468 \times .08\frac{1}{2}$.

10. Multiply 43.267 by .00032.

11. $.112 \div .0000015$.

12. Reduce $\frac{19}{40}$, $\frac{59}{80}$, and $\frac{71}{125}$ to decimals.

13. Find the G. C. D. of 630, 1134, and 1386.

14. Add 843, 75.876, .45, 8.437, .4328, and 76.89.

15. Find the common prime factors of 1155 and 2205.

16. $876 + 94 \times 16 - (\overline{72 \times 19} \div 9 + 9 \times \overline{144 \div 8} - 175)$.

17. At $6.45 per C, how many pounds of beef cost $47.73 ?

18. Reduce .45, .007, .04, and .04008 to a common denominator.

19. Which is greater, and how much, .35 of 878 or $.04\frac{1}{2}$ of 84 times 700 ?

To THE TEACHER. — Teach 121 and 122.

LESSON 5.

1. Learn 119 . . . 122.

2. Multiply $\frac{13}{8}$ by $\frac{24}{13}$.

3. $\frac{5}{7} \times \frac{3}{5} \times \frac{2}{3}$.

4. Divide 31.5 by .126.

5. $43.7 \div .15$.

6. Multiply $742.45 by $.07\frac{1}{2}$.

7. $.078 \times .0009$.

8. Express in words 7.008, .000005, and 8.7.

9. Find the difference between .0235 and .48.

10. Reduce $\frac{154}{220}$, $\frac{110}{121}$, and $\frac{492}{744}$ to their lowest terms.

11. Find the least common multiple of 50, 70, and 95.

12. Find the least common multiple of 81, 63, and 135.

13. At $6 a hundred, how many pounds of beef cost $57.90?

14. At $7.65 a hundred, what will 1836 pounds of beef cost?

15. A farmer raised 639 bushels of potatoes and sold 497 bushels. What part of his crop had he left?

16. The difference between two numbers is 19785, and the smaller number is 7988. Find the larger number.

TO THE TEACHER. — Teach 123.

LESSON 6.

1. Learn 119 . . . 123.
2. Divide 132 by $\frac{11}{35}$.
3. $9\frac{3}{4} - 5\frac{7}{8}$.
4. Divide 65.2 by .005.
5. $\frac{54}{47} \div 12$.
6. $78\frac{4}{7}$ is $\frac{5}{7}$ of what number?
7. $24.6 \div .00012$.
8. Find the sum of $16\frac{1}{2}$, $14\frac{2}{3}$, and $17\frac{3}{4}$.
9. Reduce .75, $.37\frac{1}{2}$, and .045 to common fractions.
10. Reduce .006, .4006, and .007 to similar decimals.
11. Find the greatest common divisor of 521 and 971.
12. Find the greatest common factor of 3768 and 3596.
13. Find the cost of 14125 feet of lumber at $24 per M.
14. At $6.40 a ton, how much will 2875 pounds of coal cost?
15. The product of two numbers is 30420, and one of them is 39. Find the other number.

TO THE TEACHER. — Show how to work such examples as the thirteenth, fourteenth, and fifteenth, in Lesson 7.

LESSON 7. 1. Change $\frac{1}{2}$, $\frac{2}{3}$, $\frac{4}{5}$, and $\frac{6}{7}$ to 210ths.

2. Multiply $\frac{11}{14}$ by 7. 3. $175 \times \frac{7}{25}$.

4. Multiply .000342 by 43. 5. $.000078 \times .017$.

6. Reduce $\frac{9}{16}$, $\frac{17}{2500}$, and $\frac{51}{2000}$ to decimals.

7. Find the prime factors of 864 and 15125.

8. Express in words .0076, .01457, and 49.246.

9. Find the cost of 837 pounds of sugar at $5.43 per C.

10. If the divisor is 675 and the quotient 289, what is the dividend?

11. Find the smallest number that is exactly divisible by 12, 24, 36, and 96.

12. The difference between $\frac{1}{2}$ of a number and $\frac{1}{3}$ of the same number is 126. What is the number?

13. The sum of two numbers is 785, and the larger one is 4 times the smaller. Find the numbers.

14. The sum of two numbers is 245, and the smaller one is $\frac{2}{3}$ of the larger. Find the numbers.

15. The sum of two numbers is 704, and the larger one is $2\frac{2}{3}$ times the smaller. Find the numbers.

To the Teacher. — Have pupils write decimals from dictation and read decimals written on the board.

LESSON 8. 1. From 89 subtract $28\frac{2}{5}$.

2. Add $9\frac{4}{5}$ and $8\frac{2}{3}$. 3. $3\frac{3}{4} \div \frac{5}{16}$.

4. Divide $9\frac{3}{8}$ by $3\frac{3}{4}$. 5. $72\frac{1}{2} - 28\frac{2}{3}$.

6. Divide 66 by .015. 7. $38.7 \div .017$.

8. Add 8.47, 439, 84.36, 9.458, 79.43, 178, and 78.57.

9. Find the value of 865 pounds of hay at $16 a ton.

10. How many feet of lumber, at $28 per M, cost $251.02?

11. Find the largest number that will exactly divide 1938 and 1666.

12. What is the smallest number that is exactly divisible by 29 and 37?

13. Reduce .47, .0406, .004, and .8 to decimals having a common denominator.

14. A man spends $750, which is $\frac{5}{6}$ of his salary. How much does he save?

15. A man paid $960 for a carriage and a span of horses, paying 3 times as much for the horses as he paid for the carriage. How much did he pay for each?

To the Teacher. — Have pupils write decimals from dictation and read decimals written on the board.

LESSON 9.

1. Learn 105 . . . 123.

2. $\dfrac{\frac{1}{3} + \frac{3}{4} + 2}{\frac{7}{12} + \frac{2}{3} + \frac{1}{6}}$.

3. $\$42.75 \times .04\frac{1}{2}$.

4. $16\frac{3}{5} + 18\frac{2}{3} + 28\frac{11}{15}$.

5. Find the difference between .342 and .0763.

6. Reduce .625, .25, and .0025 to common fractions.

7. At $7.35 per M, how much will 12244 brick cost?

8. The sum of two numbers is 854, and one of them is $\frac{3}{4}$ of the other. Find the numbers.

9. If I can do a piece of work in $\frac{7}{8}$ of a day, what part of it can I do in $\frac{3}{4}$ of a day?

10. What is the difference between the greatest common divisor of 66, 99, and 165 and their least common multiple?

11. Find the number of square feet in the sides and bottom of a box 2 ft. long, 18 in. wide, and 13 in. deep.

12. Write a receipt that you should receive for the payment of money on account.

To the Teacher. — Teach 124 . . . 129.

LESSON 10.

1. Learn 121 . . . 129.

2. Divide $\frac{4}{15}$ by $1\frac{3}{5}$.

3. $\frac{13}{25} \div 5\frac{1}{5}$.

4. Divide 10028 by .23.

5. 1210 ÷ .044.

6. Reduce $\frac{73}{1600}$, $\frac{29}{800}$, and $\frac{41}{4000}$ to decimals.

7. Find the greatest common factor of 945 and 702.

8. Find the cost of $16\frac{3}{8}$ cords of wood at $$4\frac{1}{2}$ a cord.

9. Find the common prime factors of 48, 72, and 112.

10. Find the greatest common factor of 1088, 867, and 714.

11. How many pounds of coal, at $5.25 a ton, cost $218.82 ?

12. Reduce .2, .375, and $.33\frac{1}{3}$ to common fractions by inspection.

13. Find the number of cubic inches in a joist 18 feet long and 8 by 3 inches.

14. A farmer sold three loads of straw, each load weighing 1850 pounds, at $12.50 a ton.

15. A's age is $\frac{2}{3}$ of B's, and the sum of their ages is 85 years. Find the age of each.

LESSON 11.

1. Learn 1 . . . 22.

2. Multiply .00341 by 2.3.

3. 2500 ÷ .032.

4. Add .478, 85.69, 9.462, 467, 78.64, and 9.453.

5. Reduce $\frac{744}{906}$, $\frac{505}{707}$, and $\frac{420}{864}$ to their lowest terms.

6. Reduce .9, .75, .104, and .0072 to similar decimals.

7. Find the smallest number that will exactly contain 34, 51, 65, and 121.

8. At 35 cents a peck, how many bushels of potatoes can be bought for $117.60 ?

9. The sum of three numbers is 47246, and two of them are 14257 and 9848. Find the other number.

10. A man owning $\frac{5}{7}$ of an acre of land sold $\frac{3}{7}$ of an acre. What part of his land did he sell?

11. The difference between $\frac{2}{3}$ of a fraction and $\frac{1}{4}$ of the same fraction is $\frac{5}{18}$. Find the fraction.

12. Make a bill for eight articles bought at a dry goods store to-day and receipt it as the proprietor.

LESSON 12.

1. Learn 23 . . . 32.

2. Divide .0752 by .014.

3. Divide .005232 by .16.

4. $\dfrac{1\frac{1}{2} + 2\frac{1}{4} - \frac{5}{6}}{\frac{2}{3} - \frac{5}{12} + 4}$.

5. Add $8\frac{2}{3}$, .76, $.9\frac{1}{3}$, $7.8\frac{2}{3}$, 4.85, .8, and $9\frac{1}{3}$.

6. Find the difference between .00786 and .0143.

7. Reduce $.00\frac{3}{4}$, .00005, and .85 to common fractions.

8. $246 \times 8 - 169 \div 13 - (225 \div 15) \times 16 + 207 \div 3$.

9. How much will 1584 posts cost at $16.35 a hundred?

10. A has $\$64\frac{1}{2}$, which is $\$37\frac{4}{5}$ more than B has. How much have both?

11. If $\frac{3}{5}$ of a piece of land is worth $3975, how much is it all worth at the same rate?

12. What is the length of the longest line that will exactly measure two fences, one 96 and the other 76 rods long?

13. There are 682 pupils in a school, and there are $1\frac{3}{4}$ times as many girls as boys. How many are there of each?

LESSON 13.

1. Learn 33 . . . 46.

2. Multiply 16 by $\frac{25}{48}$.

3. $\frac{15}{26} \times 3$.

4. Multiply $72.75 by $.04\frac{1}{3}$.

5. $7\frac{2}{3} + 5\frac{3}{4} + \frac{5}{6}$.

6. Reduce $\frac{24}{28}$, $\frac{18}{45}$, and $\frac{2}{3}$ to 105ths.

7. Reduce $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{19}{75}$, $\frac{2}{5}$, and $\frac{5}{8}$ to decimals.

8. Express in words 48.48, .0467, and .02354.

9. Find the value of 18650 pounds of iron at $18.40 a ton.

10. What prime numbers multiplied together will give 693 and 2336?

11. The sum of two numbers is 994, and the larger number is six times the smaller. Find the numbers.

12. Divide five hundred ninety-five millionths by $\frac{7}{8}$, and express the quotient in three different ways.

13. The product of three numbers is 18615, and two of them are 15 and 17. What is the other number?

14. What is the smallest sum that can be paid in 2, 3, 5, 10, 25, or 50-cent coins?

To the. Teacher. — Train pupils to write by inspection the decimals to which $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$, $\frac{1}{8}$, $\frac{3}{8}$, $\frac{5}{8}$, and $\frac{7}{8}$ are equal.

LESSON 14.

1. Learn 47 . . . 59.

2. Divide .00009 by .024.

3. $260 \div .08$.

4. $84\frac{4}{9}$ is $\frac{2}{3}$ of what number?

5. $.0585 \div 75$.

6. Add $8\frac{7}{8}$, $\frac{3}{4}$, $9\frac{5}{8}$, 7.48, $6\frac{1}{8}$, and 96.

7. Find the sum of $45\frac{3}{4}$, $28\frac{4}{5}$, and $18\frac{1}{2}$.

8. How many brick, at $.95 per C, cost $69.16?

9. Find the greatest common factor of 326 and 807.

10. I paid $$10\frac{1}{2}$ for 14 books. Find the price of each.

11. Find the greatest common divisor of 768 and 5184.

12. How much will 8645 oranges cost at $13.45 a thousand?

13. Reduce .4, .25, and .875 to common fractions by inspection.

14. Sold $\frac{3}{7}$ of an acre of land for $$253\frac{1}{2}$. Find the value of $\frac{1}{2}$ the remainder at the same rate.

15. The divisor is 689, the quotient $476, and the remainder $475. What is the dividend?

LESSON 15. 1. Learn 60 . . . 70.

2. Multiply .00326 by .0045. 3. 19.53 ÷ 4.2.

4. Multiply $\frac{3}{4}$ of $\frac{5}{9}$ by $\frac{4}{5}$ of $\frac{2}{3}$. 5. $9\frac{2}{3}+8\frac{5}{6}+7\frac{2}{3}$.

6. $\frac{11}{18}+\frac{5}{6}-\frac{4}{9}+\frac{5}{12}-\frac{3}{4}+\frac{2}{3}-\frac{1}{2}$. 7. .0478 × .0056.

8. Find the difference between .2145 and .03758.

9. At $8.80 per M, how many brick cost $83.38?

10. Reduce .00025, .008, and .24 to common fractions.

11. I bought six loads of coal, each load weighing 2345 pounds, at $5.80 a ton.

12. Find the two smallest numbers that 31 and 47 will exactly divide.

13. The sum of two numbers is 603, and the larger number is 8 times the smaller. Find the numbers.

14. From a flock of 185 sheep 74 were sold. What part of the flock was left?

15. How many times is the greatest common divisor of 221 and 247 contained in their least common multiple?

LESSON 16. 1. Learn 71 . . . 90.

2. Divide $58\frac{1}{3}$ by 25. 3. $240 \div \frac{16}{3}$.

4. Divide 2.52 by .00035. 5. 13.4 ÷ .0007.

6. Reduce $\frac{1}{3}$, $\frac{3}{4}$, $\frac{19}{25}$, $\frac{4}{5}$, and $\frac{7}{8}$ to decimals.

7. Find the common prime factors of 693 and 1323.

8. Reduce .6, .125, and $.66\frac{2}{3}$ to common fractions by inspection.

9. A man owning $\frac{3}{7}$ of a ship sold $\frac{4}{9}$ of his share for $8560. Find the whole value of the ship.

10. I paid $250 for a horse and had $\frac{3}{5}$ of my money left. How much had I left?

11. Find the number of square feet in the sides and bottom of a cistern 8 ft. square and 6 ft. deep.

12. The sides of a garden are 168, 182, 252, and 280 ft. long respectively. Find the greatest length of boards that can be used in fencing it without cutting any of them.

13. Make a bill for nine articles bought at a drug store at different times and receipt it for the proprietor.

To the Teacher. — **Have pupils write decimals from dictation and read decimals written on the board.**

LESSON 17.

1. Learn 91 . . . 104.

2. Multiply $2365.42 by $.08\frac{1}{2}$.

3. $.000047 \times .085$.

4. Add 459, $73\frac{3}{8}$, $9\frac{4}{5}$, $\frac{1}{4}$, $48\frac{7}{8}$, 59, and 79.468.

5. Reduce $\frac{882}{1512}$, $\frac{630}{882}$, and $\frac{216}{648}$ to their lowest terms.

6. At $13.45 a hundred, how much will 1864 melons cost?

7. Reduce .5, .8, .75, and .625 to common fractions by inspection.

8. At $\$.12\frac{1}{2}$ a pound, find the cost of $8\frac{3}{4}$ pounds of cheese.

9. If tea costs $\$\frac{4}{5}$ a pound, what part of a pound can be bought for $\$\frac{9}{20}$?

10. The sum of two fractions is $\frac{9}{10}$, and one of them is $3\frac{1}{2}$ times the other. Find the fractions.

11. How many cubic yards of earth must be excavated to make a cellar 48 ft. long, 32 ft. wide, and 7 ft. deep?

12. Find the smallest sum of money that can be exactly expended in the purchase of sheep at $8, cows at $28, oxen at $54, or horses at $162 a head.

13. Write a receipt that you should give for the payment of rent of a house.

LESSON 18.

1. Learn 105 . . . 119.

2. From $72\frac{4}{5}$ take $26\frac{1}{3}$.

3. Divide 12.42 by .036.

4. $\dfrac{\frac{5}{8} \text{ of } \frac{3}{4}}{4\frac{3}{4} - 2\frac{1}{2}}$.

5. Divide .000011 by .044. 6. $42\frac{1}{2} - 17\frac{2}{3}$.

7. $\frac{5}{9}$ of what number is 785? 8. $26\frac{3}{4} + 37\frac{2}{3}$.

9. Find the difference between .00078 and .0231.

10. $948 + (297 \div 3) \times 8 - (28 \times 45) \div 9 + \overline{86 + 75} \times 9$.

11. Find the greatest common divisor of 1815 and 3465.

12. At $20.50 a ton, how many pounds of hay cost $194.04?

13. Find the greatest common factor of 504, 672, and 1260.

14. Reduce .2, .375, and $.33\frac{1}{3}$ to common fractions by inspection.

15. Sold two loads of hay, weighing 1865 and 2385 pounds respectively, at $19.80 a ton.

16. A boy bought apples at the rate of 4 for two cents and sold them at the rate of 3 for 5 cents, gaining $4.34. How many did he buy?

LESSON 19.

1. Learn 120 . . . 129.

2. Multiply .000356 by .043. 3. $487.3 \times .00074$.

4. Reduce $\frac{2}{3}$, $\frac{1}{5}$, $\frac{3}{8}$, $\frac{1}{12500}$, and $\frac{3}{5}$ to decimals.

5. Add $\frac{7}{8}$, 7.6, $.4\frac{1}{3}$, 84.17, $9\frac{4}{5}$, $16\frac{2}{3}$, 44, and $7\frac{3}{8}$.

6. Change $\frac{12}{28}$, $\frac{40}{56}$, and $\frac{56}{88}$ to seventy-sevenths.

7. Express in words .004005, 28.00074, and .4598.

8. Find the cost of 87 feet of lumber at $26.75 per M.

9. What prime numbers multiplied together will give 459 and 2375?

10. Find the smallest number that is exactly divisible by 338, 364, and 448.

11. The difference between $\frac{3}{5}$ of a number and $\frac{1}{3}$ of the same number is 492. Find the number.

12. The difference between two numbers is 79486, and the minuend is 98979. Find the subtrahend.

13. I bought $\frac{7}{12}$ of an acre of land and sold $\frac{5}{18}$ of an acre. What part of the land had I left?

LESSON 20.

1. Add $64\frac{3}{7}$ and $59\frac{2}{3}$.

2. Simplify $\frac{2\frac{1}{7} - 1\frac{1}{2}}{4\frac{1}{2} - 1\frac{5}{7}}$.

3. $8.23 \div .07$.

4. $.000221 \div .034$.

5. Add $85\frac{7}{8}$, $\frac{3}{4}$, 8.607, $47\frac{5}{8}$, $8\frac{1}{4}$, and $83\frac{1}{8}$.

6. Reduce .65, .00125, and .000025 to common fractions.

7. Find the value of 7350 pounds of straw at $8.60 a ton.

8. A man bought flour at $\$4\frac{3}{4}$ a barrel, paying $\$80\frac{3}{4}$ for it.

9. The product of two numbers is 788544, and the multiplier is 888. Find the multiplicand.

10. A man sold a house for $4800 and lost a sum equal to $\frac{1}{4}$ of the cost. Find the cost.

11. A man gave his son and daughter $6000, giving the son three times as much as he gave the daughter. How much did he give to each?

12. A merchant has three kinds of tea: 60 pounds of the first, 75 pounds of the second, and 100 pounds of the third. He wishes to put it up in as large equal packages as possible without mixing the different kinds. How many packages will he have?

LESSON 21.

1. $213.85 is $\frac{13}{15}$ of what sum?

2. Multiply $\frac{13}{10}$ by 17.

3. $144 \times \frac{13}{16}$.

4. Multiply 47.386 by .036.

5. $.000046 \times .0017$.

6. Find the difference between 43 and .643.

7. Simplify $\frac{5}{6} + \frac{7}{8} - \frac{2}{3} - \frac{1}{2} + \frac{3}{4} + \frac{17}{24} - \frac{7}{12} + \frac{9}{16}$.

8. Reduce .128, .7, .0046, 8.14, and .75 to a common denominator.

9. Divide .0024 by $\frac{3}{8}$, and express the quotient in three different ways.

10. The divisor and quotient are each 486, and the remainder is 297. What is the dividend?

11. How many bushels of apples, at 28 cents a peck, can be bought for $87.36?

12. The sum of two numbers is 517, and one of them is ten times the other. Find the numbers.

13. What is the shortest distance that either of three poles will exactly measure, the poles being 8, 9, and 12 feet long respectively?

14. Make a bill for 9 articles bought at a market at different times and receipt it as the proprietor.

LESSON 22. 1. Multiply $986 by .20½.

2. Divide 2331 by .63. 3. $850 × .10½.

4. $\frac{15}{28}$ is $\frac{3}{7}$ of what number? 5. .000168 ÷ .035.

6. Reduce $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{17}{45}$, $\frac{2}{5}$, and $\frac{5}{8}$ to decimals.

7. Find the common prime factors of 741 and 1938.

8. Find the greatest common divisor of 666 and 2849.

9. Reduce .00375, .048, and .225 to common fractions.

10. At $7.85 per M, how much will 28435 brick cost?

11. Find the greatest common factor of 857 and 4242.

12. At $4.75 a hundred, how many pounds of mutton can be bought for $103.55?

13. At $$\frac{4}{5}$ a yard, how many yards of silk can be bought for $144?

14. Find the two smallest numbers that 59 and 61 will exactly divide.

15. A has $\frac{3}{5}$ as much money as B, and together they have $1936. How much has each?

LESSON 23.

1. Multiply $\frac{6}{7}$ of 10 by $\frac{4}{5}$ of 7.

2. Multiply .2478 by .0056.

3. $742.86 \times .07\frac{1}{2}$.

4. Add $7\frac{1}{4}$, .87, $8\frac{3}{5}$, 76.48, $\frac{7}{8}$, 68.8, and $47\frac{1}{4}$.

5. Reduce $\frac{344}{2268}$, $\frac{1242}{2323}$, and $\frac{2268}{3444}$ to their lowest terms.

6. What will 1780 pounds of plaster cost at $12 a ton?

7. Reduce .4, .25, and .875 to common fractions by inspection.

8. How many feet of lumber, at $24.40 a thousand, cost $225.09?

9. Find the number of square yards in the walls and ceiling of a room 19 ft. long, 15 ft. 6 in. wide, and 11 ft. high.

10. What is the difference between the greatest common divisor of 451 and 209 and their least common multiple?

11. What part of a piece of work can a man do in 34 days, if he can do the whole of it in 85 days?

12. The sum of two fractions is $\frac{7}{10}$, and one of them is $\frac{2}{5}$ of the other. Find the fractions.

LESSON 24.

1. Find $.20\frac{2}{3}$ of $984.

2. From 54 take $16\frac{3}{7}$.

3. $70\frac{1}{3} - 29\frac{3}{4}$.

4. Divide 45880 by .86.

5. $1.1118 \div .34$.

6. Divide $\frac{8}{11}$ of $\frac{33}{40}$ by 35.

7. $(\frac{4}{7} \text{ of } 16) \div (\frac{2}{3} \times \frac{4}{7})$.

8. Find the difference between .000835 and .00342.

9. What is the value of 4868 pounds of sugar at $4.86 a hundred?

10. Reduce .6, .125, and .66$\frac{2}{3}$ to common fractions by inspection.

11. A boy paid $48 for a watch, which was $\frac{6}{11}$ of his money. How much had he left?

12. Find the number of cubic feet of water in a cistern 12 ft. 6 in. square, if the water is 8 ft. deep.

13. A man saved $2160 in two years. He saved 2$\frac{3}{5}$ times as much the second year as he saved the first year. How much did he save each year?

14. Three men, having $1260, $2268, and $2772 respectively, agree to buy land at the highest price per acre that will allow each man to invest all his money. How many acres can each man buy?

To the Teacher. — **Have pupils write decimals from dictation and read decimals written on the board.**

LESSON 25. **1.** Multiply $786.38 by .12$\frac{1}{2}$.

2. Reduce $\frac{20}{24}$, $\frac{28}{36}$, and $\frac{35}{63}$ to 54ths.

3. Find the prime factors of 736 and 891.

4. Reduce $\frac{1}{3}$, 7$\frac{3}{4}$, $\frac{17}{18}$, 8$\frac{4}{5}$, and 3$\frac{7}{8}$ to decimals.

5. At $14.50 a ton, what will 24480 pounds of iron cost?

6. How many pounds of plaster, at $6.80 a ton, cost $12.75?

7. Reduce .2, .375, and .33$\frac{1}{3}$ to common fractions by inspection.

8. The sum of three numbers is 74381, and two of them are 27478 and 19769. Find the other number.

9. $\frac{4}{5}$ of a certain number is greater than $\frac{1}{2}$ of it by 120. What is the number?

10. What is the length of the shortest piece of wire that can be cut into pieces 16, 18, or 22 ft. long?

11. A earned $1375. He spent $348 for board and $477 for other expenses. What part of his salary did he save?

12. Make a bill for labor performed by yourself. Have six items in it. Receipt it properly.

LESSON 26.

1. $28\frac{2}{3}$ is $\frac{8}{9}$ of what number?
2. Divide 360 by $\frac{8}{45}$.
3. $42\frac{1}{2} \div 10$.
4. Divide .00035 by .028.
5. $4.35 \div .7$.
6. Add 96.4, $9\frac{5}{8}$, 248, $43\frac{3}{8}$, $\frac{7}{8}$, $78\frac{4}{5}$, and .84.
7. Find the G. C. D. of 8876, 4718, and 6951.
8. Simplify $\frac{7}{12} + 4\frac{2}{3} + \frac{3}{4} + 8\frac{1}{2} + \frac{5}{6} + \frac{8}{9} + \frac{5}{18}$.
9. $879 + 7 \times \overline{275 \div 5} - (432 - 275) \times 4 + 43 \times 17$.
10. Find the greatest common divisor of 2768 and 839.
11. Find the greatest common factor of 147731 and 49373.
12. Reduce .5, .8, .75, and .625 to common fractions by inspection.
13. How many cubic feet are there in a wall 40 ft. long, $8\frac{1}{2}$ ft. high, and 18 in. thick?
14. After paying $\frac{1}{5}$ of a debt, and then $\frac{1}{3}$ of the remainder, I owe $294 less than at first. How much was the debt?
15. Write a receipt that you should receive for the payment of an account in full.

LESSON 27.

1. Multiply 241.37 by .00074
2. Simplify $\frac{1\frac{5}{6} + 5\frac{1}{2}}{4\frac{1}{4} - 2\frac{2}{3}}$.
3. $\frac{12}{23} \times 9$.
4. $18 \times \frac{19}{36}$.
5. Add $18\frac{7}{8}$, $25\frac{3}{4}$, $87\frac{1}{2}$, $64\frac{2}{3}$, and $42\frac{5}{6}$.
6. Add $7\frac{3}{8}$, $9\frac{1}{3}$, $.7\frac{4}{5}$, $8.48\frac{2}{3}$, $.5\frac{1}{3}$, $\frac{7}{8}$, $4\frac{2}{3}$, and $42\frac{1}{8}$.
7. Find the difference between 73.2 and .0315.
8. Express in words 45.9, .000094, and .0000009

9. Find the smallest number that is exactly divisible by 84, 336, and 472.

10. The sum of two numbers is 790, and one of them is nine times the other. Find the numbers.

11. A man bought a watch for $81, which was .15 of his money. How much money had he left?

12. The product of three numbers is 97284, and two of them are 33 and 44. Find the other number.

13. A farmer has 78 sheep in one field, and this number is $\frac{3}{5}$ of the number in another field. How many sheep has he?

LESSON 28.

1. Find .30$\frac{1}{5}$ of $1265.

2. Divide 608 by .064.

3. 403 ÷ .325.

4. Reduce $\frac{2}{3}$, $9\frac{1}{5}$, $\frac{13}{17}$, $4\frac{3}{8}$, and $\frac{3}{5}$ to decimals.

5. Find the cost of 95 pounds of coal at $6.60 a ton.

6. Find the common prime factors of 1072 and 8019.

7. Reduce .075, .00012, and .0125 to common fractions.

8. At $\$\frac{3}{8}$ a yard, what part of a yard of ribbon can be bought for $\$\frac{3}{16}$?

9. At 20 cents a half-peck, how many bushels of onions can be bought for $28.80?

10. The divisor is 278, the quotient 197, and the remainder 194. What is the dividend?

11. What is the average price of 25 sheep, if 17 of them cost $5.75 a head and the others $8.25 a head?

12. If $\frac{3}{4}$ of a ton of coal costs $\$4\frac{1}{5}$, how many tons can be bought for $\$123\frac{1}{5}$ at the same price?

13. A man has four lots, which are 120, 420, 600, and 900 ft. wide respectively. He wishes to divide them into as few lots of equal width as possible. How many lots can he make?

LESSON 29. 1. Multiply \$873.64 by $.08\frac{1}{4}$.

2. Add $.78\frac{3}{4}$, $9\frac{4}{5}$, $.7\frac{1}{8}$, $.9\frac{1}{4}$, 78.3, 48.96, $4\frac{5}{8}$, and $79\frac{4}{5}$.

3. Find the cost of 3794 fence-pickets at \$2.35 per C.

4. Reduce $\frac{924}{1232}$, $\frac{928}{1320}$, and $\frac{324}{2184}$ to their lowest terms.

5. At \$$\frac{3}{8}$ a yard, how much will $12\frac{7}{8}$ yards of silk cost?

6. Reduce .4, .125, and $.66\frac{2}{3}$ to common fractions by inspection.

7. Find the three smallest numbers that 41 and 51 will exactly divide.

8. At \$4.50 a barrel, what part of a barrel of flour can be bought for \$2.50?

9. Divide nine hundred-thousandths by $\frac{3}{8}$, and express the quotient in three different ways.

10. The sum of two numbers is 720, and one of them is $2\frac{1}{5}$ times the other. Find the numbers.

11. There are three wheels which revolve in 25, 30, and 50 seconds respectively. What is the shortest time in which all of them will make an exact number of revolutions?

LESSON 30. 1. $\frac{35}{48}$ is $\frac{7}{8}$ of what number?

2. Simplify $\dfrac{1\frac{7}{8} + 2 - 1\frac{3}{4}}{4\frac{1}{2} + 3\frac{1}{4}}$.

3. $63 \div .0084$.

4. $.000048 \div .064$.

5. Find the difference between $\frac{19}{21}$ and $\frac{23}{35}$.

6. Find the G. C. D. of 1095, 1022, and 292.

7. Find the difference between .00445 and .0273.

8. How many poles, at \$9.50 per C, cost \$138.70?

9. Find the greatest common factor of 1197 and 1312.

10. Find the greatest common divisor of 2041 and 8476.

11. Reduce .18, .035, .0425, and .76 to common fractions.

12. At \$9.50 a ton, what will 3480 pounds of plaster cost?

13. Find the number of square feet in the whole inside surface of a room 22 ft. square and 12 ft. high.

14. A and B together have $946, and $\frac{2}{3}$ of A's money is equal to $\frac{4}{5}$ of B's. How much has each?

LESSON 31. 1. Learn 1 . . . 22.

2. Multiply .7384 by .024. 3. .000075 × .0088.

4. Multiply $\frac{5}{9}$ of $5\frac{1}{7}$ by $\frac{3}{5}$ of $24\frac{1}{2}$.

5. Change $\frac{15}{27}$, $\frac{84}{120}$, and $\frac{42}{54}$ to ninetieths.

6. Reduce $\frac{1}{4}$, $9\frac{1}{8}$, $\frac{2}{5}$, $\frac{3}{58}$, and $5\frac{5}{8}$ to decimals.

7. What are the prime factors of 448 and 2133?

8. At $8.20 per M, how many envelopes cost $17.63?

9. Reduce .5, .8, .75, and .625 to common fractions by inspection.

10. How many times is the greatest common divisor of 484 and 1146 contained in their least common multiple?

11. The difference between $\frac{5}{6}$ of a number and $\frac{2}{5}$ of the same number is 442. What is the number?

12. How many 2-inch cubes are there in a block of marble 4 ft. long, 22 in. wide, and 16 in. thick?

13. Make a bill for 12 articles bought at a grocery store at different times and receipt it for the proprietor.

LESSON 32. 1. Learn 23 . . . 32.

2. Divide .00084 by .48. 3. 610 ÷ 125.

4. Simplify $\frac{7}{9} + \frac{11}{18} - \frac{5}{27} + \frac{5}{6} - \frac{1}{2} + \frac{37}{54} - \frac{2}{3}$.

5. Add $.84\frac{3}{4}$, 49.38, $7.8\frac{1}{4}$, .68, $76\frac{3}{8}$, 9.45, and $.68\frac{2}{5}$.

6. $796 + 84 \times 16 - (431 - 278) \times 4 + 643 - 539 \div 7$.

7. Reduce .4, .25, and .875 to common fractions by inspection.

8. Find the cost of 26435 feet of lumber at $28.40 a thousand feet.

9. If $\$27000$ is $\frac{4}{9}$ of the value of a store, how much is the store worth?

10. A farmer sold 35 bushels of clover-seed at a uniform price, receiving $\$227\frac{1}{2}$ for it.

11. A man paid $20700 for two farms, paying five times as much for the second one as he paid for the first. Find the cost of each.

12. What is the highest price per head that can be paid for sheep by three men, having $560, $240, and $100 respectively, so that each may invest all his money? How many sheep can each man buy?

To the Teacher. — Have pupils write decimals from dictation and read decimals written on the board.

LESSON 33.

1. Learn 33 . . . 46.

2. Simplify $\dfrac{2\frac{1}{4} + 1\frac{1}{2} \div \frac{2}{3}}{8\frac{1}{2} - \frac{5}{6} \times \frac{3}{4}}$.

3. $\$427 \div .05$.

4. $\$2168.75 \times .44$.

5. What number added to $47\frac{4}{5}$ will give $91\frac{1}{4}$?

6. Find the difference between 7.23 and .0943.

7. Reduce .00007, .26, .4, and .167 to similar decimals.

8. A farmer sold six loads of hay, each load weighing 2345 pounds, at $16.80 a ton.

9. The difference between two numbers is 57968, and the subtrahend is 8695. Find the minuend.

10. The sum of two numbers is 992, and one of them is seven times the other. Find the numbers.

11. A man owing $1445 paid $487 at one time and $533 at another time. What part of the debt did he still owe?

12. A merchant wishes to buy hats at $3, $4, $5, and $6 apiece and to expend the same sum for each kind. What is the least amount that he can invest, and how many hats can he buy?

LESSON 34. 1. Learn 47 . . . 59.

2. Divide 243 by .054. 3. .000165 ÷ .044.

4. $47\frac{5}{8}$ is $\frac{3}{8}$ of what number? 5. $2146.80 × .20$\frac{1}{3}$.

6. Reduce $\frac{1}{3}$, $\frac{3}{4}$, $7\frac{1}{5}$, $9\frac{4}{13}$, and $\frac{7}{8}$ to decimals.

7. Reduce .65, :00015, and .525 to common fractions.

8. Find the common prime factors of 1908 and 1980.

9. Find the greatest common factor of 1155 and 1029.

10. At $9.75 per M, how much will 16544 brick cost?

11. Find the greatest common divisor of 3321 and 2336.

12. Divide $\frac{7}{8}$ of $\frac{4}{5}$ of $\frac{9}{14}$ of 8 times $\frac{5}{9}$ by $\frac{8}{11}$ of 9 times $\frac{11}{12}$.

13. At $6.40 a ton, how many pounds of coal cost $53.28?

14. If the product is 259740 and the multiplicand 468, what is the multiplier?

15. A and B bought a store for $10500, and A paid $\frac{3}{4}$ as much as B. How much did each invest in the store?

16. Write a receipt that you should receive for the payment of rent of a house.

LESSON 35. 1. Learn 60 . . . 70.

2. Multiply $\frac{19}{85}$ by 75. 3. 51 × $\frac{5}{17}$.

4. Multiply .0579 by .078. 5. 586 × .000008.

6. Add .9$\frac{3}{4}$, $6\frac{2}{3}$, 5.4$\frac{3}{5}$, .8$\frac{1}{3}$, $7\frac{4}{5}$, $\frac{5}{8}$, and $72\frac{7}{8}$.

7. Add .75$\frac{1}{8}$, $86\frac{7}{8}$, $\frac{5}{8}$, $73\frac{4}{5}$, .8$\frac{3}{5}$, 86.7, and $36\frac{3}{8}$.

8. Express in words .7008, 700.007, and .800007.

9. What cost 865 pounds of straw at $8.30 a ton?

10. Find the least common multiple of 233 and 659.

11. Reduce $\frac{875}{1500}$, $\frac{924}{1092}$, and $\frac{480}{1248}$ to their lowest terms.

12. Find the least common multiple of 352, 880, and 9680.

13. A man has $\frac{8}{15}$ of a barrel of vinegar. If he sells $\frac{2}{5}$ of a barrel, what part of the vinegar will remain?

14. The divisor and quotient are each 476, and the remainder is 209. What is the dividend?

15. The sum of two numbers is 423, and one of them is $\frac{4}{5}$ of the other. Find the numbers.

LESSON 36.

1. Learn 71 . . . 90.

2. $\dfrac{\frac{11}{12} + 1\frac{1}{3} + \frac{5}{6} - 2\frac{1}{2}}{2\frac{3}{4} + \frac{7}{8} - 1\frac{1}{8}}$.

3. $7.83 \div .86$.

4. $1190 \div .034$.

5. Find the sum of $8\frac{5}{6}$, $\frac{5}{12}$, $7\frac{11}{16}$, and $9\frac{5}{8}$.

6. Find the difference between .00783 and .0231.

7. Reduce .6, .125, and $.66\frac{2}{3}$ to common fractions by inspection.

8. Find the three smallest numbers of which 37 and 45 are exact divisors.

9. My house and lot cost $9800, the house costing $3\frac{2}{3}$ times as much as the lot. Find the cost of each.

10. Two farms containing each an exact number of acres were purchased for $4165 and $21021 respectively. If the highest uniform price per acre was paid for each, how many acres were there in each farm?

11. Make a bill for 8 articles bought at a dry goods store to-day and receipt it as the proprietor.

LESSON 37.

1. Learn 91 . . . 104.

2. Multiply $\$248\frac{3}{4}$ by .24.

3. $4785 \div .0005$.

4. Multiply $116\frac{1}{7}$ by $5\frac{1}{3}$ times $\frac{3}{4}$ of 7.

5. Reduce $\frac{27}{39}$ and $\frac{63}{91}$ to seventy-eighths.

6. Reduce $\frac{2}{3}$, $\frac{1}{5}$, $9\frac{3}{8}$, $\frac{4}{85}$, and $\frac{3}{5}$ to decimals.

7. Find the prime factors of 544 and 1323.

8. Find the cost of 8545 pounds of beef at $7.15 per C.

9. Reduce .4, .25, and .875 to common fractions by inspection.

10. Divide .0036 by $\frac{3}{4}$, and express the quotient in three different ways.

11. How many bushels of apples, at 65 cents a half-bushel, cost $75.40?

12. The difference between $\frac{6}{7}$ of a fraction and $\frac{3}{5}$ of the same fraction is $\frac{9}{49}$. Find the fraction.

13. Find the smallest sum that could be expended in the purchase of cows at $24, $27, $32, $36, or $56 apiece.

14. How many square inches of paper will be required to cover the sides and top of a box 2 ft. long, 16 in. wide, and one foot high on the outside?

LESSON 38. 1. Learn 105 . . . 119.

2. Divide $3\frac{21}{50}$ by 9. 3. $396 \div \frac{12}{17}$.

4. Divide .00024 by .032. 5. $9.23 \div .45$.

6. $\frac{33}{65}$ is $\frac{11}{15}$ of what number? 7. $\$480.75 \times .10\frac{2}{3}$.

8. Find the difference between $\frac{8}{17}$ and $\frac{11}{12}$.

9. Add $74\frac{5}{8}$, 8.438, $.45\frac{1}{2}$, $8\frac{3}{8}$, 73, $6\frac{4}{5}$, $\frac{5}{8}$, and $46\frac{3}{4}$.

10. Find the greatest common divisor of 891 and 1072.

11. Find the greatest common factor of 1197 and 2375.

12. Reduce .35, .0875, .065, and .86 to common fractions.

13. At $8.75 a hundred, how many pounds of beef can be bought for $142.10?

14. If $\frac{5}{8}$ of a yard of ribbon costs $\$\frac{7}{8}$, how much will $4\frac{5}{7}$ yards cost at the same price?

15. Find the number of cords of wood in a pile 16 ft. square on the ground and 12 ft. high.

16. Bought four loads of coal, weighing 2165, 1980, 2345, and 2245 pounds respectively, at $6.25 a ton.

LESSON 39.

1. Learn 120 . . . 129.

2. Multiply .847 by 24.9.

3. $\$4500 \times .07\frac{1}{3}$.

4. Add $73\frac{3}{4}$, $16\frac{5}{7}$, $29\frac{1}{2}$, and $87\frac{11}{14}$.

5. Find the difference between 28.34 and .7436.

6. How much will 17450 envelopes cost at $3.80 per M ?

7. How many pencils, at $19.50 a thousand, cost $63.18 ?

8. Reduce .2, .375, and $.33\frac{1}{3}$ to common fractions by inspection.

9. The sum of three numbers is 44273, and two of them are 16497 and 9868. Find the other number.

10. What is the difference between the greatest common divisor of 85 and 221 and their least common multiple ?

11. What part of a yard of ribbon can be bought for $.81, if a yard costs $1.08 ?

12. The sum of two numbers is 528, and one of them is 11 times the other. Find the numbers.

To the Teacher. — Have pupils write decimals from dictation and read decimals written on the board.

LESSON 40.

1. Find $.10\frac{1}{3}$ of $1548.

2. Divide 832 by .032.

3. $1.16 \div .16$.

4. Reduce $\frac{1}{4}$, $9\frac{1}{8}$, $\frac{2}{5}$, $\frac{11}{95}$, $\frac{3}{8}$, and $\frac{5}{8}$ to decimals.

5. Find the common prime factors of 1375 and 3321.

6. Reduce .075, .00025, and $.033\frac{1}{3}$ to common fractions.

7. $1474 - 1728 \div 12 - (95 - \overline{45 \times 5} \div 3 + 47 \times 3) \times 8$.

8. At $\$\frac{3}{8}$ apiece, how many melons can be bought for $\$9\frac{3}{4}$?

9. I sold a piece of land for $8400 and gained $\frac{3}{4}$ as much as it cost. Find the cost.

10. A farmer sold 8765 pounds of hay at $14.50 a ton, and twice as much at $16.80 a ton.

11. If $\frac{3}{8}$ of an acre of land is sold for \$$73\frac{1}{2}$, how much is the remainder worth at double the rate?

12. A farmer has 260 bushels of rye, 384 bushels of oats, and 416 bushels of wheat. If he sends the grain to market in as few bags of equal size as possible without mixing the grain, how many bags will be required?

LESSON 41.

1. Learn 1 . . . 22.

2. Multiply \$268 by .37.

3. $4.86 \times .00045$.

4. Add $49\frac{1}{8}$, $.436\frac{1}{4}$, $4\frac{7}{8}$, .68, $17\frac{1}{2}$, $.9\frac{3}{8}$, and 8.38.

5. Reduce $\frac{891}{1455}$, $\frac{777}{1998}$, and $\frac{1818}{2323}$ to their lowest terms.

6. At \$$\frac{7}{8}$ a bushel, how much will $145\frac{1}{2}$ bushels of wheat cost?

7. Reduce .5, .8, .75, .625, and .6 to common fractions by inspection.

8. If the product is 470400 and the multiplier 48, what is the multiplicand?

9. The sum of two fractions is $\frac{5}{8}$, and one of them is $2\frac{3}{4}$ times the other. Find the fractions.

10. If a man can do a piece of work in $\frac{3}{4}$ of a day, what part of it can he do in $\frac{2}{3}$ of a day?

11. Six men agree to expend equal sums in the purchase of land. The first pays \$25 an acre; the second, \$27; the third, \$40; the fourth, \$75; the fifth, \$80; and the sixth, \$120. What is the least sum that all can expend, and how many acres will all purchase?

12. Make a bill for five articles bought at a shoe store at different times and receipt it for the proprietor.

LESSON 42.

1. Learn 23 . . . 32.

2. Simplify $\dfrac{2\frac{1}{2} + \frac{2}{3} \div \frac{4}{5}}{3\frac{1}{6} - \frac{3}{4} \times 2\frac{1}{3}}$.

3. Divide 1.89 by .25.

4. Divide .00057 by .15.

5. Find the G. C. D. of 88, 97, and 162.

6. Find the difference between $\frac{35}{42}$ and $\frac{17}{28}$.

7. Find the difference between .00843 and .0216.

8. How much will 42440 lath cost at $2.25 per M ?

9. Reduce .38, .0066$\frac{2}{3}$, and .00625 to common fractions.

10. How many pounds of hay, at $17 a ton, cost $1.53 ?

11. Find the greatest common factor of 240, 336, and 1768.

12. The divisor is 807, the quotient 297, and the remainder 584. What is the dividend ?

13. I paid $375 for a carriage, which was equal to $\frac{3}{5}$ of the sum paid for a span of horses. Find the cost of both.

14. A, owning $\frac{4}{7}$ of a mill, sold $\frac{2}{5}$ of his share to B, and $\frac{5}{6}$ of what he then owned to C for $680. What did B pay for his share, and what was the value of the mill ?

15. Write a receipt that you should give for the payment of money on account.

LESSON 43.

1. Learn 33 . . . 46.

2. Multiply .084 by .0036. 3. $468.75 × .08$\frac{1}{3}$.

4. Change $\frac{15}{51}$ and $\frac{63}{119}$ to eighty-fifths.

5. Add 9.6$\frac{4}{5}$, 8$\frac{2}{3}$, $\frac{3}{8}$, 17$\frac{1}{8}$, 6.4$\frac{1}{3}$, .5$\frac{3}{8}$, and 28.6$\frac{2}{5}$.

6. Reduce $\frac{1}{3}$, 8$\frac{3}{4}$, $\frac{4}{5}$, $\frac{2}{75}$, 4$\frac{1}{8}$, $\frac{3}{5}$, and 3$\frac{7}{8}$ to decimals.

7. Express in words .0004006, 400.008, and 28.0075.

8. At $9.50 a ton, what cost 2845 pounds of plaster ?

9. If $\frac{2}{3}$ of a number exceeds $\frac{4}{9}$ of it by 146, what is the number ?

10. What prime numbers multiplied together will give 992 and 2619 ?

11. Find the three smallest numbers that 13, 19, and 23 will exactly divide.

12. How many times is the greatest common divisor of 391 and 575 contained in their least common multiple?

13. A merchant cut 39 yards of muslin from a piece containing 52 yards. What part of the piece was left?

LESSON 44. **1.** Learn 47 . . . 59.

2. Divide 5780 by .17. **3.** .2641 ÷ .19.

4. $\frac{26}{35}$ is $\frac{13}{21}$ of what number? **5.** $875 × .20$\frac{3}{5}$.

6. Add 57.49, 8.9$\frac{3}{4}$, 267$\frac{3}{8}$, 76$\frac{4}{5}$, 8.468, and 94$\frac{7}{8}$.

7. $\frac{9}{10} + \frac{13}{15} - \frac{2}{3} - \frac{1}{2} + \frac{11}{12} - \frac{3}{4} + \frac{17}{20} - \frac{2}{3} + \frac{5}{6} + \frac{13}{20}$.

8. Find the cost of 1824 boards at $12.75 a hundred.

9. Reduce .2, .375, and .33$\frac{1}{3}$ to common fractions by inspection.

10. At $.35 a half-peck, how many bushels of peaches can be bought for $128.80?

11. A man sold corn at $$\frac{5}{8}$ a bushel, receiving $176 for it. How many bushels did he sell?

12. Find the number of square feet in the sides and bottom of a cistern 14 ft. square and 8$\frac{1}{2}$ ft. deep.

13. I paid $560 for a horse and carriage, paying three times as much for the horse as I paid for the carriage.

14. A man has two farms containing 78 acres and 324 acres respectively. Into how many equal fields can he divide them and have the fields as large as possible?

LESSON 45. **1.** Learn 60 . . . 70.

2. Simplify $\frac{4\frac{1}{2} \div \frac{3}{4} + 1\frac{3}{8}}{1\frac{5}{8} \times 8 - \frac{8}{13} - 10\frac{3}{26}}$. **3.** 314 × $\frac{7}{25}$.

4. .00038 × .009.

5. Cloth that cost 58\frac{2}{5}$ was sold for 49\frac{3}{4}$.

6. Find the difference between .73 and .00492.

7. Find the value of 17345 pounds of iron at $16.75 a ton.

8. Reduce .005, .432008, .2, and .42 to a common denominator.

9. Divide .00015 by $\frac{5}{8}$, and express the quotient in three different ways.

10. How many 3-inch cubes are there in a stick of timber 28 ft. long and 6 by 9 inches?

11. The sum of two numbers is 2664, and one of them is five times the other. Find the numbers.

12. A can hoe a row of corn in a certain field in 30 min., B in 20 min., and C in 35 min. What is the least number of rows that each can hoe in order that all may finish at the same time?

LESSON 46. 1. Learn 71 . . . 90.

2. Divide .00306 by .45. 3. $.723 \div .14$.

4. What is the G. C. D. of 693, 1197, and 736?

5. Reduce $\frac{2}{3}$, $9\frac{1}{5}$, $\frac{3}{1250}$, $\frac{3}{8}$, $4\frac{4}{5}$, and $7\frac{3}{5}$ to decimals.

6. How many oranges, at $2.25 per C, cost $28.26?

7. $1647 - (246 + 324) - (\overline{75 \times 8} \div 3 + 3 \times \overline{600 \div 4})$.

8. What are the common prime factors of 2336 and 8019?

9. Find the greatest common factor of 900, 1764, and 1908.

10. Divide $\frac{13}{15}$ of $\frac{9}{11}$ of $\frac{10}{13}$ of $2\frac{3}{4}$ times 12 by $3\frac{2}{3}$ times $1\frac{7}{11}$ times 3.

11. Reduce .3, .25, and .875 to common fractions by inspection.

12. In a mixture of 216 bushels of corn and oats, the number of bushels of oats is $\frac{4}{5}$ of the number of bushels of corn. Find the number of bushels of each.

13. Make a bill for 12 articles bought at a stove and hardware store at different times and receipt it as the proprietor.

LESSON 47.

1. Learn 91 . . . 104.

2. Multiply $2485 by .28. 3. $.000075 \times .88$.

4. Multiply $\frac{5}{8}$ of $\frac{3}{7}$ of 11 by $\frac{3}{11}$ of $\frac{8}{3}$ of $3\frac{1}{2}$.

5. Add $7\frac{1}{4}$, $.63\frac{3}{8}$, $96\frac{1}{8}$, 27.96, $46\frac{4}{5}$, $8\frac{5}{8}$, $738\frac{3}{5}$, and $87\frac{7}{8}$.

6. Reduce $\frac{2388}{4704}$, $\frac{3584}{3808}$, and $\frac{5643}{5940}$ to their lowest terms.

7. How many feet of lumber, at $16.80 per M, cost $212.52 ?

8. Reduce .6, .125, and $.66\frac{2}{3}$ to common fractions by inspection.

9. What will 48750 feet of pine lumber cost at $28.40 a thousand feet ?

10. What is the difference between the greatest common divisor of 319 and 1450 and their least common multiple ?

11. The difference between two numbers is 49786, and the minuend is 72315. Find the subtrahend.

12. The sum of two fractions is $\frac{26}{27}$, and one of them is $\frac{4}{9}$ of the other. Find the fractions.

13. If I buy $\frac{14}{15}$ of a bushel of peanuts and sell $\frac{2}{5}$ of a bushel, what part of the peanuts have I left ?

LESSON 48.

1. Learn 105 . . . 119.

2. $$\frac{(2\frac{2}{3} + 3\frac{3}{4}) \div \frac{11}{12}}{\frac{10}{11} \times (3\frac{3}{5} - 2\frac{1}{2})}.$$

3. Divide 460 by $7\frac{1}{7}$.

4. Divide $2\frac{8}{45}$ by 70.

5. Divide 1127 by .023. 6. Divide .901 by .34.

7. Add $8\frac{3}{10}$, $7\frac{3}{5}$, $18\frac{4}{7}$, 96, $8\frac{1}{2}$, and $9\frac{9}{14}$.

8. Find the difference between .000789 and .0045.

9. Reduce $.0033\frac{1}{3}$, .0875, and $.066\frac{2}{3}$ to common fractions.

10. The product is 511010, and the multiplicand is 746. What is the multiplier ?

11. A man sold nine loads of hay, each load weighing 2165 pounds, at $15.50 a ton.

12. A lady paid $70.74 for a dress and hat, paying $4\frac{2}{3}$ times as much for the dress as she paid for the hat.

13. A has $620; B, $1116; and C, $1488; with which they agree to buy horses at the highest price per head that will allow each man to invest all his money. How many horses can each purchase?

To the Teacher. — **Have pupils write decimals from dictation and read decimals written on the board.**

LESSON 49. **1.** Learn 120 . . . 129.

2. Multiply .000753 by .08. **3.** $418.75 × $.05\frac{1}{2}$.

4. Reduce $\frac{2}{9}$, $\frac{15}{27}$, $\frac{14}{18}$, and $\frac{35}{55}$ to 99ths.

5. Find the prime factors of 1029 and 1980.

6. Reduce $12\frac{1}{8}$, $28\frac{3}{8}$, $\frac{17}{2000}$, $18\frac{5}{8}$, and $9\frac{7}{8}$ to decimals and add them.

7. Reduce .125, $.33\frac{1}{3}$, .375, $.66\frac{2}{3}$, .875, and .625 to common fractions by inspection.

8. What is the value of a car-load of coal, weighing 40730 pounds, at $5.20 a ton?

9. The divisor is 684, the quotient 752, and the remainder 579. What is the dividend?

10. The difference between $\frac{6}{7}$ of a number and $\frac{1}{2}$ of the same number is 265. What is the number?

11. In a mixture of grain there are 60 bushels of corn, 30 bushels of oats, and 15 bushels of rye. What part of the mixture is each?

12. A grocer wishes to buy tea at 56, 63, and 72 cents a pound and to expend the same sum for each kind. What is the least sum that he can expend, and how many pounds of tea must he buy?

13. Write a receipt that you should receive for the payment of an account in full.

LESSON 50. 1. Learn 104 . . . 129.

2. A has $385, which is equal to .44 of B's money. How much have both?

3. If .375 of a yard of silk costs $1.20, how many yards will cost $51.60?

4. A man sold 544 bushels of potatoes, which was .64 of his whole crop. How many bushels had he left?

5. A has five times as much money as B. If A has $750.64 more than B, how much has each?

6. If .7½ of a ton of hay is worth $12.60, how much must be paid for 8¾ tons?

7. A man paid me $189.84, which is equal to .28 of what he still owes me. How much was the debt at first?

8. Two men hire a pasture for $51.50. A puts in 48 sheep, and B puts in 36 sheep. How much should each pay?

9. After a farmer had sold .34 of his wheat, he had 495 bushels left How much would he have received for his whole crop at $.88 a bushel?

10. A man owed me $535.15. The sum he has paid me is 2⅔ times what he still owes me. How much does he owe me?

11. A man divided $35.42 between his two sons in such a way that the younger received ¾ as much as the elder. How much did each receive?

12. A man worked 18½ days, and after paying for his board and other expenses with ⅖ of his earnings, he had $38.85 left. How much did he earn per day?

SIXTH GRADE — SECOND TERM.

LESSON 1. 1. Add $68\frac{4}{5}$, $27\frac{1}{4}$, and $35\frac{1}{2}$.

2. Divide 73.8 by .0008. 3. $16.9 \div 1.3$.

4. Reduce 5 rd. 4 yd. 2 ft. 11 in. to inches.

5. Reduce 178435 inches to higher denominations.

6. Reduce .25, .8, .0012, and .04 to common fractions.

7. What part of 4 bu. 1 pk. 6 qt. is 2 bu. 3 pk. 4 qt.?

8. $1974 - (143 - 78) - (96 + \overline{13 \times 15} \div 5 - 13 \times 7)$.

9. At $6.85 a hundred, what will 1748 pounds of beef cost?

10. At 18 cents a half-peck, how many bushels of onions can be bought for $12.96?

11. There are $1\frac{3}{4}$ times as many girls in a school as there are boys. If the whole number is 682, how many are there of each?

12. A merchant sold flour for $2845 and lost $275.85. How much would he have received for it, if he had gained $316?

13. The sides of a garden are 168, 182, 252, and 280 ft. respectively. What is the greatest length of boards that can be used in fencing it without cutting any of them? How many boards will be required if the fence is made four boards high?

To the Teacher. — **Teach 130 . . . 137, also 159 . . . 161.**

LESSON 2. 1. Learn 130 . . . 137, also 159 . . . 161

2. $28\frac{2}{3}$ is $\frac{8}{9}$ of what number? 3. .045 gal. = ?

4. Multiply 43.267 by .00052. **5.** $.475 \times .00048$.

6. Reduce $\frac{13}{50}$, $\frac{7}{25}$, and $\frac{17}{20}$ to decimals.

7. Reduce $\frac{7}{8}$ of a rod to lower denominations.

8. Reduce .652 of a rod to lower denominations.

9. Reduce $\frac{5}{6}$ of a bushel to lower denominations.

10. Reduce .865 of a gallon to lower denominations.

11. Reduce 9 sq. rd. 15 sq. yd. 7 sq. ft. to square feet.

12. At $5.85 a ton, what will 4785 pounds of coal cost?

13. At $.12$\frac{1}{2}$ a pound, how much will 8$\frac{3}{4}$ pounds of sugar cost?

14. Find the smallest number that is exactly divisible by 338, 364, and 448.

15. How many square feet are there in the walls and ceiling of a room 18 ft. long, 14 ft. wide, and 10 ft. high?

16. A man bought wheat for $39600 and sold it for $42750, thereby gaining 7 cents a bushel. How much did it cost per bushel?

LESSON 3. **1.** Learn 130 . . . 137, also 159 . . . 161.

2. What part of 16 rd. is 12 rd. 8 yd.?

3. Add 6$\frac{2}{3}$, .475, 9.4$\frac{1}{2}$, .345, .5$\frac{1}{3}$, $\frac{7}{8}$, and 8$\frac{5}{8}$.

4. Reduce $\frac{6}{7}$ of a rod to yards, feet, and inches.

5. Find the difference between 48.79 and .6834.

6. Reduce .685 of a ton to lower denominations.

7. At $8.75 per C, how many pounds of beef cost $161?

8. I paid 10\frac{1}{2}$ for 14 books. What was the price of each?

9. What prime numbers multiplied together will give 441 and 900?

10. The sum of two numbers is 994, and one of them is six times the other. Find the numbers.

11. A man bought 12465 pounds of wool at 28 cents a pound and sold it at a profit of $623.25.

12. Find the number of cubic feet of air in a room 14 ft. long, 11 ft. wide, and 8 ft. 6 in. high.

13. At the rate of $5.95 for 7 bushels of potatoes, how many bushels can be bought for $37.40 ?

14. A man sold a house for $6450 and lost $1050. How much would he have gained or lost, if he had sold it for $6250 ?

TO THE TEACHER. — Teach 162 and 163.

LESSON 4. 1. Learn 130 . . . 137, also 159 . . . 163.

2. Divide 31.5 by .126. 3. 43.7 ÷ .15.

4. Find the difference between $\frac{47}{63}$ and $\frac{79}{84}$.

5. Reduce .054 and .0008 to common fractions.

6. Reduce 2 qt. 1 pt. to the decimal of a gallon.

7. Reduce 2 pk. 4 qt. to the decimal of a bushel.

8. Reduce 1 qt. 1 pt. 2 gi. to the fraction of a gallon.

9. Find the greatest common factor of 1815 and 1260.

10. $876 + 94 \times 16 - (\overline{72 \times 19} \div 9 + 9 \times \overline{144 \div 8} - 175)$.

11. Reduce 23673 square inches to higher denominations.

12. Find the cost of 18755 feet of lumber at $22.50 per M.

13. How far can a man travel in 36 days at the rate of 116 miles in 8 days ?

14. A man gave his son $450, which was $\frac{2}{44}$ of his money. How much money had he left ?

15. A boy gathered 4 bu. 1 pk. of chestnuts, which he sold at nine cents a quart.

LESSON 5. 1. Learn 138 . . . 158.

2. Multiply $742.45 by .07½. 3. 144 × $\frac{15}{16}$.

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4. Reduce $\frac{1}{16}$, $\frac{7}{500}$, and $\frac{13}{250}$ to decimals.

5. Reduce $\frac{7}{9}$ of an acre to lower denominations.

6. Find the value of 985 pounds of hay at $18 a ton.

7. What part of 5 sq. yd. 7 sq. ft. is 4 sq. yd. 6 sq. ft.?

8. Reduce $\frac{18}{25}$ of a square foot to the fraction of a square yard.

9. How many feet of lumber, at $18.50 a thousand, can be bought for $174.64?

10. Sold $\frac{3}{7}$ of an acre of land for 253\frac{1}{2}$. Find the value of one-half the remainder at the same rate.

11. The difference between two numbers is 16748, and the smaller number is 8679. Find the larger number.

12. A lady bought two pounds of tea at 55 cents a pound and 3 pounds at $1 a pound. What was the average price paid?

13. A man sold a mill for $16750 and lost $1850. How much would he have received for it, if he had sold it at a profit of $2500?

LESSON 6. 1. Learn 130 . . . 145.

2. What part of a yard is 2 ft. 6 in.?

3. Find the difference between .0235 and .48.

4. What are the prime factors of 112 and 385?

5. How many quarts are there in .975 of a bushel?

6. Reduce 4 cu. yd. 18 cu. ft. 400 cu. in. to cubic inches.

7. Add .948, 4$\frac{3}{8}$, .6$\frac{2}{3}$, 8$\frac{3}{4}$, .777, 4$\frac{1}{3}$, and 647.85, and express the sum in words.

8. If 420 barrels of flour cost $1785, how much will 375 barrels cost?

9. The product of two numbers is 30420, and one of them is 39. What is the other number?

10. A man bought flour at \$$4\frac{3}{4}$ a barrel, paying \$$80\frac{3}{4}$ for it. How many barrels did he buy?

11. A man gave his daughter \$4500, which was equal to $\frac{3}{5}$ of the sum he gave to his son. How much did he give to both?

12. Make a bill for nine articles bought at a drug store at different times and receipt it for the proprietor.

LESSON 7. **1.** Learn 146 . . . 163.

2. Divide 65.2 by .005. **3.** 24.6 ÷ .00012.

4. Reduce 7 s. 6 d. to the decimal of a pound.

5. Reduce $\frac{4}{70}$ of a gallon to the fraction of a pint.

6. Reduce .28, .125, and .005 to common fractions.

7. $\frac{7}{8} + \frac{8}{9} - \frac{1}{2} - \frac{2}{3} + \frac{7}{12} + \frac{5}{6} - \frac{11}{18} + \frac{17}{36} - \frac{3}{4} + \frac{13}{24}$.

8. Find the cost of 1870 pounds of sugar at \$4.85 per C.

9. What part of 4 lb. 6 oz. 16 pwt. is 1 lb. 8 oz. 22 pwt.?

10. If the divisor is 585 and the quotient 297, what is the dividend?

11. The sum of two numbers is 612, and one of them is 8 times the other. Find the numbers.

12. A merchant has three kinds of tea: 60 pounds of the first, 75 pounds of the second, and 100 pounds of the third, which he wishes put up in as few equal packages as possible without mixing the different kinds. How many packages will he have?

13. Write a receipt that you should receive, if you pay your grocer \$25 on account to-day.

LESSON 8. **1.** Learn 159 . . . 163.

2. Multiply $\frac{6}{7}$ of 10 by $\frac{4}{5}$ of 7. **3.** .000342 × 43.

4. Reduce $\frac{1}{125}$, $\frac{3}{40}$, and $\frac{3}{2000}$ to decimals.

5. Change $\frac{5}{8}$ of a ton to lower denominations.

6. Reduce 6435826 oz. to higher denominations.

7. Reduce $9\frac{3}{5}$ oz. to the decimal of a Troy pound.

8. What is the smallest number that 29 and 45 will exactly divide?

9. A farmer sold three loads of straw, each load weighing 1875 pounds, at $8.50 a ton.

10. Find the difference between the greatest common divisor of 451 and 209 and their least common multiple.

11. A man lost $\frac{1}{3}$ of his money, gave $\frac{1}{4}$ of it for a house, and had $15000 left. How much did the house cost?

12. Six men bought 1240 acres of land at $16 an acre and sold it for $34720. How much did each gain?

13. Bought 160 acres of land at $24 an acre. For how much must I sell it per acre to gain $1280?

LESSON 9. 1. Reduce .525 of a cord to cubic feet.

2. Find the difference between .342 and .0763.

3. Add $9.64\frac{2}{3}$, 486, 75.38, $7\frac{7}{8}$, 78.432, $9\frac{4}{5}$, and $246\frac{1}{3}$.

4. Reduce .112 of a quart to the decimal of a bushel.

5. How many pounds of coal, at $6.50 a ton, cost $9.10?

6. What part of 4 cu. ft. 400 cu. in. is 3 cu. ft. 800 cu. in.?

7. At $\$\frac{4}{5}$ a yard, how many yards of silk can be bought for $176?

8. What prime numbers multiplied together will give 1197 and 2275?

9. A man owning $\frac{3}{7}$ of a ship sold $\frac{4}{9}$ of his share for $8560. Find the value of the ship.

10. Find the number of square feet in the four sides and bottom of a box 4 ft. long, 30 in. wide, and 18 in. deep.

11. A dealer sold 426 tons of coal at $4.45 a ton, 264 tons at $4.85 a ton, and 165 tons at $5.10 a ton. How much did he receive for all?

12. Make a bill for ten articles bought at a market at different times and receipt it as the proprietor.

To THE TEACHER. — If it is found that pupils can do more work than is contained in the remaining lessons for this term, assign part or all of the corresponding lessons in Fifth Grade, Third Term.

LESSON 10.

1. Learn 130 . . . 145.

2. Divide 66 by .015.

3. 38.7 ÷ .017.

4. Find the G. C. D. of 741 and 1938.

5. Reduce 9 gal. 3 qt. 1 pt. 2 gi. to gills.

6. What number added to $48\frac{2}{7}$ will give 234?

7. Reduce 8 cwt. 75 lb. to the fraction of a ton.

8. Reduce .75, $.37\frac{1}{2}$, and .045 to common fractions.

9. Reduce .0044 of a bushel to the decimal of a pint.

10. Find the greatest common divisor of 857 and 4242.

11. At $6.85 per M, how much will 16480 brick cost?

12. Find the greatest common factor of 320, 368, and 432.

13. Multiply the sum of 246 and 332 by three times their difference.

14. If $\frac{3}{5}$ of a piece of silk is worth $48.75, how much is the other part worth?

15. Find the number of cubic inches in a joist 16 feet long and 10 by 3 inches.

LESSON 11.

1. Learn 146 . . . 163.

2. Multiply $68.75 by $.04\frac{1}{2}$.

3. $47.52 ÷ $.07\frac{1}{3}$.

4. Reduce $\frac{19}{40}$, $\frac{59}{80}$, and $\frac{71}{125}$ to decimals.

5. What part of £6 8 s. 9 d. is £2 6 s. 4 d.?

6. Reduce 9 cwt. 90 lb. to the decimal of a ton.

7. How many brick, at $.85 per C, cost $71.40?

8. Find the value of 24875 pounds of iron at $16.80 a ton.

9. How many days, hours, minutes, and seconds are there in $\frac{9}{11}$ of a week?

10. The sum of two fractions is $\frac{9}{10}$, and one of them is $3\frac{1}{2}$ times the other. Find the fractions.

11. What is the length of the shortest piece of wire that can be cut into pieces 16, 18, or 22 feet long?

12. The sum of three numbers is 52134, and two of them are 17421 and 13484. What is the other number?

13. If I buy 260 sheep at $4.75 a head and 240 at $5.75 a head, what is the average price paid?

LESSON 12.

1. Divide $89.28 by $.10\frac{1}{3}$.

2. Find the prime factors of 585 and 1764.

3. Reduce $10\frac{2}{7}$ in. to the fraction of a yard.

4. Add .478, $85.69\frac{2}{3}$, $8\frac{7}{8}$, 97, $7.4\frac{1}{3}$, $47\frac{4}{5}$, and $9\frac{5}{8}$.

5. Find the difference between .00786 and .0143.

6. Reduce 276427 sq. ft. to higher denominations.

7. How many seconds are there in .555 of a day?

8. At $8.40 per M, how many brick are worth $77.70?

9. $246 \times 8 - 169 \div 13 + 743 - (225 \div 15) \times 16 + 475$.

10. At $\$\frac{3}{8}$ a yard, what part of a yard of ribbon can be bought for $\$\frac{3}{16}$?

11. John earns $485 in a year, which is $\frac{5}{9}$ as much as his father earns. How much do both earn?

12. A man bought land at $12 an acre, paying $5160 for it, and sold it at $16 an acre.

13. Make a bill for labor performed by yourself. Have five items in it. Receipt it properly.

LESSON 13. **1.** Find .20$\frac{1}{2}$ of $1578.

2. Divide 10028 by .23. **3.** 1210 ÷ .044.

4. What part of 6 da. 18 hr. is 4 da. 8 hr.?

5. Reduce 8.4 hr. to the fraction of a week.

6. Reduce $\frac{1}{84}$ of a yard to the fraction of an inch.

7. What fraction must be added to $\frac{1}{2}\frac{3}{2}$ to make $\frac{3}{3}\frac{1}{3}$?

8. Reduce .625, .25, and .0025 to common fractions.

9. How much will 1876 posts cost at $12.50 a hundred?

10. The product of three numbers is 180540, and two of them are 15 and 17. Find the other number.

11. A boy bought apples at the rate of 4 for 2 cents and sold them at the rate of 3 for 5 cents, thereby gaining $4.34.

12. Three men, having $1260, $2268, and $2772 respectively, agree to buy land at the highest price per acre that will allow each man to invest all his money. How many acres must they buy?

13. Two men are 211 miles apart. If they travel toward each other, one 58 miles a day and the other 43 miles a day, how far apart will they be at the end of the first day?

LESSON 14. **1.** Multiply .00341 by 2.3.

2. What part of a rod is 11 feet? **3.** $934 × .30$\frac{1}{2}$.

4. Reduce $\frac{9}{16}$, $\frac{17}{2500}$, and $\frac{51}{2000}$ to decimals.

5. At $$\frac{3}{8}$ a yard, what will 14$\frac{7}{8}$ yards of silk cost?

6. Reduce 2 sq. yd. 74 sq. ft. 88 sq. in. to square inches.

7. Express .00075 of a square foot as the decimal of a square inch.

8. I bought seven loads of coal, each load weighing 2345 pounds, at $5.65 a ton.

9. Find the smallest number that is exactly divisible by 84, 336, and 472.

10. If the divisor is 675, the quotient 488, and the remainder 548, what is the dividend?

11. A farmer sold 64 sheep and had $\frac{5}{7}$ of his flock left. How many had he left?

12. A man bought 468 acres of land at $65 an acre. He sold part of it at the same price, receiving $17810 for it. How many acres had he left?

13. Write a receipt that you should receive for the payment of rent.

LESSON 15. 1. Learn 130 . . . 145.

2. Find the difference between .2145 and .03758.

3. What are the prime factors of 3915 and 1312?

4. What part of 5 A. 80 sq. rd. is 3 A. 120 sq. rd.?

5. Reduce $\frac{12}{13}$ of a Troy pound to lower denominations.

6. Reduce 5 sq. ft. 90 sq. in. to the decimal of a square yard.

7. Find the two smallest numbers that 71 and 89 will exactly divide.

8. Add $8\frac{7}{8}$, $.9\frac{1}{3}$, $9\frac{5}{8}$, 7.65, $6\frac{2}{3}$, 748, and 47.85, and express the sum in words.

9. A farmer sold 35 bushels of clover-seed, receiving $\$227\frac{1}{2}$ for it. How much more would he have received for it at $8.75 a bushel?

10. The difference between $\frac{3}{5}$ of a number and $\frac{1}{3}$ of the same number is 492. Find the number.

11. A farmer has six bins, each one containing 245 bushels of wheat. He has sold 786 bushels. What was the value of his whole crop at 95 cents a bushel?

12. Make a bill for 12 articles bought at a grocery store at different times and receipt it for the proprietor

LESSON 16.

1. Learn 146 . . . 163.
2. Divide .005232 by .016.
3. .0752 ÷ .014.
4. Find the difference between $\frac{11}{15}$ and $\frac{7}{12}$.
5. Reduce $7\frac{1}{9}$ qt. to the decimal of a bushel.
6. Find the G. C. D. of 4718, 6951, and 8876.
7. Reduce 128576 gi. to higher denominations.
8. What will 7750 oranges cost at $16.80 per M ?
9. Reduce .0875 of an acre to lower denominations.
10. Reduce $.00\frac{3}{4}$, .00005, and .85 to common fractions.
11. Find the greatest common factor of 839 and 2768.
12. Find the greatest common factor of 147731 and 49373.
13. Find the number of square feet in the sides and bottom of a cistern 12 ft. square and 7 ft. deep.
14. A man sold a horse and carriage for $345 and lost $\frac{2}{7}$ as much as they cost. How much did he pay for them ?
15. A man bought 860 barrels of apples at $2.15 a barrel. He lost 55 barrels and sold the remainder at $2.75 a barrel.

LESSON 17.

1. Multiply $88.96 by $.04\frac{1}{4}$.
2. Multiply $\frac{5}{9}$ of $5\frac{1}{7}$ by $\frac{3}{5}$ of $24\frac{1}{2}$.
3. Reduce $\frac{73}{1600}$, $\frac{29}{800}$, and $\frac{41}{4000}$ to decimals.
4. What part of a quart is $\frac{3}{112}$ of a bushel ?
5. Reduce .15 of a pound to the decimal of a ton.
6. At $18 a ton, how many pounds of hay cost $61.20 ?
7. What part of 4 sq. rd. 160 sq. ft. is 2 sq. rd. 20 sq. ft. ?

8. Sold two loads of hay, weighing 2265 and 2470 pounds respectively, at $18.75 a ton.

9. How many cubic yards of earth must be excavated to make a cellar 46 ft. long, 32 ft. wide, and 8 ft. deep?

10. One-half of one number is 624, and 4 times another number is 2668. Find three times the sum of the two numbers.

11. A father gave his son and daughter $7500, giving the son four times as much as he gave the daughter. How much did he give to each?

12. A cellar is 38 ft. long and 28 ft. wide inside the wall. If the wall is 8 ft. high and 18 in. thick, how many cubic yards of masonry does it contain?

LESSON 18. 1. Divide $200.08 by $.20\frac{1}{3}$.

2. Reduce 16 bu. 3 pk. 6 qt. to quarts.

3. Find the prime factors of 2205 and 3025.

4. Find the difference between .00078 and .0231.

5. Reduce 1 oz. 4 pwt. to the fraction of a pound.

6. What decimal part of a gallon is .75 of a pint?

7. $948 + (297 \div 3) \times 8 - (28 \times 45) \div 9 + \overline{86 + 75} \times 9.$

8. At $1.25 a hundred, how many envelopes cost $77.70?

9. At $\$\frac{3}{8}$ apiece, how many melons can be bought for $\$33\frac{3}{4}$?

10. Add $87\frac{2}{3}$, .438, $9\frac{4}{5}$, $.7\frac{7}{8}$, $47\frac{5}{8}$, $9\frac{1}{3}$, and $58\frac{1}{8}$, and express the sum in words.

11. What is the average price of 25 cows, if 16 of them cost $50 a head and the others $75 a head?

12. A man put $\frac{1}{2}$ of his money in one bank, $\frac{1}{4}$ in another, $\frac{1}{5}$ in another, and had $4200 left. How much did he deposit in the three banks?

13. A cellar wall is 40 ft. long and 30 ft. wide on the outside. If it is 7 ft. high and 2 ft. thick, how many cubic yards of masonry does it contain?

LESSON 19.

1. Learn 1 . . . 32.

2. Divide .00009 by .024.

3. 260 ÷ .08.

4. Add $64\frac{5}{6}$, $47\frac{4}{5}$, $59\frac{7}{15}$, $74\frac{2}{3}$, and $65\frac{7}{10}$.

5. Reduce $\frac{11}{12}$ of a mile to rods and feet.

6. Reduce 18 hr. 9 min. to the decimal of a day.

7. Reduce .00025, .008, and .23 to common fractions.

8. At $18.75 a hundred, how much will 1644 melons cost?

9. What part of 2 gal. 3 qt. 3 gi. is 1 gal. 2 qt. 1 pt. 2 gi.?

10. The sum of two numbers is 847, and one of them is 10 times the other. Find the numbers.

11. The difference between two numbers is 84778, and the minuend is 912138. Find the subtrahend.

12. A farmer has 175 bushels of wheat in one bin, 268 bushels in a second bin, and in a third bin 64 bushels less than in both the others. Find the value of his whole crop at $.84 a bushel.

13. A man has four lots, which are 120, 420, 600, and 800 ft. wide respectively. He wishes to divide them into as few lots of equal width as possible. How many lots can he make?

LESSON 20.

1. Learn 33 . . . 46.

2. Multiply .00326 by .0045.

3. 347 ÷ .008.

4. Reduce $\frac{19}{75}$, $\frac{5}{80}$, $\frac{17}{40}$, and $\frac{3}{250}$ to decimals.

5. What part of a mile is 140 rods 4 yards?

6. How many quarts are there in 4.35 bushels?

7. Reduce 364276 sq. ft. to higher denominations.

8. Find the value of 12750 pounds of straw at $7.80 a ton.

9. How many shingles, at $4.80 a thousand, can be bought for $61.20?

10. How many times is the greatest common divisor of 484 and 1146 contained in their least common multiple?

11. If the product is 788544 and the multiplier 888, what is the multiplicand?

12. A man bought land for $15360 and sold it for $20160, thereby gaining $3.75 an acre. Find the cost per acre.

13. A man has $4500 in one bank, which is equal to $\frac{3}{7}$ of what he has in another bank. How much has he in both banks?

LESSON 21. 1. Learn 47 . . . 59.

2. Find the difference between 58 and .846.

3. Reduce 2 ft. 8 in. to the decimal of a yard.

4. What part of a square inch is $\frac{7}{1728}$ of a square foot?

5. A man sold corn at $$\frac{5}{8}$ a bushel, receiving $265 for it.

6. What part of 4 lb. 8 oz. 16 pwt. is 1 lb. 10 oz. 12 pwt.?

7. What prime numbers multiplied together will give 539 and 1155?

8. Add $76\frac{1}{3}$, $\frac{3}{4}$, 9.846, $8.6\frac{2}{3}$, $9\frac{7}{10}$, and $96\frac{1}{8}$, and express the sum in words.

9. A has $\frac{3}{5}$ as much money as B, and together they have $1800. How much has each?

10. If the divisor and quotient are each 476 and the remainder is 386, what is the dividend?

11. A farmer raised 248 bushels of potatoes one year, twice as many the second year, and the third year three times as many as he had the second year. How many did he raise in the three years?

12. Make a bill for six articles bought at a shoe store at different times and receipt it for the proprietor.

LESSON 22. **1.** Learn 60 . . . 70.

2. Divide 2.52 by .00035. **3.** 13.4 ÷ .0007.

4. Simplify $\frac{11}{15} + \frac{2}{3} - \frac{1}{2} + \frac{19}{30} - \frac{3}{5} + \frac{9}{10} - \frac{5}{6}$.

5. Reduce 13 rd. 3 yd. 1 ft. 8 in. to inches.

6. Find the G. C. D. of 1095, 1022, and 292.

7. Reduce .00005 of a ton to the decimal of a pound.

8. Find the greatest common factor of 2041 and 8476.

9. Reduce $65\frac{5}{11}$ sq. in. to the fraction of a square foot.

10. Find the value of 95 ft. of lumber at $28.50 per M.

11. Reduce .65, .00125, and .000025 to common fractions.

12. Find the two smallest numbers that 59 and 69 will exactly divide.

13. A man bought a suit of clothes for $26, which was $\frac{4}{11}$ of his money. How much money had he left?

14. Two men are 286 miles apart. If they travel toward each other, one 4 miles an hour and the other 3 miles an hour, how far apart will they be at the end of 32 hours?

LESSON 23. **1.** Learn 71 . . . 90.

2. Multiply $2365.42 by $.08\frac{1}{2}$. **3.** $74.42 ÷ $.08\frac{5}{7}$.

4. Multiply $116\frac{1}{7}$ by $5\frac{1}{3}$ times $\frac{3}{4}$ of 7.

5. Reduce 52.8 ft. to the fraction of a mile.

6. Reduce $\frac{19}{25}$, $\frac{7}{1250}$, $\frac{3}{800}$, and $\frac{1}{4000}$ to decimals.

7. What part of 1 cwt. 44 lb. 14 oz. is 96 lb. 12 oz.?

8. Reduce $\frac{8}{9}$ of a square rod to lower denominations.

9. How much will 2640 pounds of plaster cost at $12.80 a ton?

10. The sum of two fractions is $\frac{7}{10}$, and one of them is $\frac{2}{5}$ of the other. Find the fractions.

11. A man paid $1140 for sheep at $4.75 a head and sold them at $6.25 a head.

12. Find the number of square yards in the walls and ceiling of a room 19 ft. 6 in. long, 15 ft. 6 in. wide, and 11 ft. high.

13. A merchant wishes to buy hats at $3, $4, $5, and $6 apiece and to expend the same sum for each kind. What is the least number of hats he can buy?

14. Write a receipt that you should receive for the payment of an account in full.

LESSON 24. 1. Learn 91 . . . 104.

2. Find the prime factors of 1593 and 3904.

3. Find the difference between .000835 and .00342.

4. Reduce 1345165 seconds to higher denominations.

5. Reduce 121 sq. ft. to the fraction of a square rod.

6. Reduce .95 of a cubic yard to lower denominations.

7. Add $7\frac{1}{3}$, .87, $8\frac{3}{5}$, $5\frac{7}{8}$, 69, $8\frac{2}{3}$, and $9\frac{3}{8}$, and express the sum in words.

8. A farmer sold $45\frac{1}{2}$ bushels of wheat for $$36\frac{2}{5}$. What was the price per bushel?

9. Find the number of cubic feet of water in a cistern 12 ft. square, if the water is 8 ft. deep.

10. A lady spent $\frac{1}{4}$ of her money for a cloak, $\frac{1}{5}$ for a dress, and had $60.50 left. How much did she spend?

11. Bought 18 acres of land at $90 an acre and 27 acres at $135 an acre. Sold it all at $160 an acre. What was the gain per acre?

12. Make a bill for 8 articles bought at a hardware store at different times and receipt it as the proprietor.

LESSON 25.

1. Learn 105 . . . 119.

2. Divide $65.52 by $.08\frac{2}{3}$.

3. $12.42 \div .036$.

4. Divide .000011 by .044.

5. $\$68.16 \div .06\frac{6}{7}$.

6. Reduce 9 s. 4 d. 2 far. to the decimal of a pound.

7. Reduce $\frac{5}{1176}$ of a week to the fraction of an hour.

8. Reduce .00375, .048, and .225 to common fractions.

9. At $16.80 a ton, what will 28475 pounds of iron cost?

10. How many pounds of coal, at $6.80 a ton, cost $29.41?

11. What part of 8 cu. yd. 12 cu. ft. is 6 cu. yd. 18 cu. ft.?

12. The sum of three numbers is 81217, and two of them are 24793 and 18468. Find the other number.

13. A man saved $2160 in two years. If he saved $2\frac{3}{5}$ times as much the second year as he saved the first, how much did he save each year?

14. A yard 100 ft. square is enclosed by a wall 8 ft. high and 2 ft. thick. How many cubic yards of masonry are there in the wall?

LESSON 26.

1. Learn 120 . . . 129.

2. Multiply .000356 by .043.

3. $.0075 \times .0048$.

4. Find the L. C. M. of 352, 880, and 9680.

5. Reduce $\frac{1}{12500}$, $\frac{19}{8000}$, and $\frac{23}{400}$ to decimals.

6. Reduce $70\frac{2}{5}$ cu. ft. to the decimal of a cord.

7. Reduce 16 lb. 9 oz. 15 pwt. 16 gr. to grains.

8. At $6.75 per M, what will 26785 brick cost?

9. $879 + 7 \times \overline{275 \div 5} - (432 - 275) \times 4 + 43 \times 17$.

10. Reduce .0005 of an acre to the fraction of a square rod.

11. Find the smallest number that is exactly divisible by 233 and 659.

12. A farmer sold .24 of his wheat to one man, .44 to another, and had 272 bushels left. How many bushels did he sell?

13. If .4 of a barrel of sugar is worth $6.98, how much must be paid for 4 barrels?

14. If .375 of a yard of silk costs $1.20, how many yards will cost $51.60?

15. Eight men bought property for $240000 and sold it for $266000. How much did each gain?

LESSON 27. 1. Learn 130 . . . 145.

2. Find the difference between 4.2 and .0124.

3. Reduce $\frac{2}{7}$ of a gallon to lower denominations.

4. What part of 12 yd. 2 ft. 8 in. is 4 yd. 10 in.?

5. Find the value of 48675 pounds of coal at $5.60 a ton.

6. Add $9\frac{5}{8}$, .845, $7\frac{2}{3}$, $56\frac{4}{5}$, $.65\frac{1}{3}$, 59.34, and $37\frac{3}{8}$, and express the sum in words.

7. If $.7\frac{1}{2}$ of a ton of hay is worth $12.60, how much must be paid for $8\frac{1}{4}$ tons?

8. If $\frac{4}{5}$ of a certain number is greater than $\frac{1}{2}$ of it by 180, what is the number?

9. A grocer sold 24 barrels of flour for $\$110\frac{4}{5}$. What was the price per barrel?

10. Reduce .2904 of a square yard to the decimal of a square rod.

11. A has $385, which is equal to .44 of B's money. How much have both?

12. At $4.25 a rod, how much will it cost to fence a field, two sides of which are each 86 rods, one side 74 rods, and the other side 62 rods?

LESSON 28. 1. Learn 146 . . . 163.

2. Divide .00021 by .034. 3. $8.23 \div .07$.

4. Find the sum of $68\frac{1}{2}$, $58\frac{2}{3}$, $72\frac{5}{6}$, and $94\frac{7}{9}$.

5. What part of a week is 1 day 18 hours?

6. Reduce .075, .00012, and .0125 to common fractions.

7. Change .785 of a Troy pound to lower denominations.

8. Reduce 189795 square inches to higher denominations.

9. Bought .55 of a barrel of flour for $2.97. At the same price, how many barrels would cost $31.05?

10. A man bought 42475 pounds of wool at 28 cents a pound. He lost 4750 pounds by fire and sold the remainder at 35 cents a pound.

11. A man paid me $189.84, which is equal to .28 of what he still owes me. How much did he owe me at first?

12. Sold 819 bushels of wheat and had $\frac{4}{7}$ of my crop left. What was the value of the remainder at $.86 a bushel?

13. J. H. Lee buys 10 articles at a dry goods store to-day. Imagine yourself the proprietor and make a receipted bill for them.

LESSON 29. 1. Divide $73.45 by $.10\frac{5}{6}$.

2. Multiply $742.68 by $.10\frac{2}{3}$. 3. $\$678 \times .20\frac{5}{6}$.

4. What part of a quart is $\frac{5}{224}$ of a bushel?

5. Reduce 2 R. 20 sq. rd. to the decimal of an acre.

6. How many pounds of beef, at $7.25 per C, cost $353.80?

7. At $24.40 per M, how many feet of lumber cost $361.73?

8. What part of 16 sq. rd. 24 sq. yd. is 12 sq. rd. 18 sq. yd.?

9. At $9.50 a ton, how much will 6275 pounds of plaster cost?

10. At $$\frac{7}{8}$ a bushel, how much will $145\frac{1}{2}$ bushels of wheat cost?

11. A man bought .35 of an acre of land for $336. How much would 4 acres cost at the same rate?

12. What is the average price of five horses, costing $130, $145, $180, $210, and $275 respectively?

13. After paying $\frac{1}{5}$ of a debt, and then $\frac{1}{3}$ of the remainder, I owe $385 less than at first. How much do I owe now?

LESSON 30. 1. Multiply $896 by $.30\frac{5}{7}$.

2. Reduce $6\frac{6}{13}$ hr. to the fraction of a week.

3. Find the difference between .00738 and .0216.

4. Reduce .0025 of a yard to the decimal of an inch.

5. Reduce 23 sq. rd. 19 sq. yd. 6 sq. ft. to square feet.

6. Divide $\frac{14}{15}$ of $\frac{9}{16}$ of $1\frac{6}{11}$ times $\frac{10}{21}$ of 28 times $\frac{11}{18}$ by $2\frac{5}{6}$ times $\frac{4}{7}$ of $\frac{1}{13}$.

7. Add $.78\frac{1}{3}$, $8\frac{4}{5}$, 98, $7\frac{5}{8}$, .326, $54\frac{2}{3}$, and $.6\frac{3}{5}$, and express the sum in words.

8. What is the value of 8758 pounds of sugar at $4.55 per hundredweight?

9. A man sold wheat for $24200 and gained $\frac{1}{10}$ as much as it cost. Find the cost.

10. The smaller of two numbers is contained 18 times in 1350, and the greater number is 38 times the smaller. Find the sum of the two numbers.

11. Find the number of square feet in the whole inside surface of a room 16 ft. square and 8 ft. high.

12. A cellar wall is 38 ft. long and 30 ft. wide on the outside. If it is 8 ft. high and 18 in. thick, how many cubic yards of masonry does it contain?

LESSON 31.

1. Find .20$\frac{2}{3}$ of $1824.

2. Divide 2331 by .63.

3. .000168 ÷ .035.

4. Reduce 11.2 ft. to the fraction of a rod.

5. What part of 80 A. 120 sq. rd. is 5 A. 80 sq. rd.?

6. Reduce $\frac{4}{5}$ of a cubic yard to lower denominations.

7. The sum of two numbers is 960, and one of them is nine times the other. Find the numbers.

8. A farmer sold 544 bushels of potatoes, which was .64 of his whole crop. How many had he left?

9. How many 2-inch cubes are there in a block of marble 5 ft. long, 28 in. wide, and 18 in. thick?

10. A farmer sold 8 loads of hay, each load weighing 2285 pounds, at $14.60 a ton.

11. Two farms, each containing an exact number of acres, were bought for $4165 and $21021 respectively. If the highest uniform price per acre was paid for each, how many acres were there in both farms?

12. Two men are 98 miles apart. If they travel away from each other, one 78 miles a day and the other 147 miles a day, how far apart will they be at the end of the second day?

LESSON 32.

1. Find .40$\frac{1}{2}$ of $1780.

2. Reduce $\frac{17}{18}$, $\frac{7}{8000}$, and $\frac{9}{2500}$ to decimals.

3. Reduce 438979 cu. in. to higher denominations.

4. Reduce .185 of an acre to lower denominations.

5. $796 + 84 \times 16 - (431 - 278) \times 4 + 643 - 539 \div 7$.

6. At $280 an acre, what is the value of a piece of land 8 rods long and 4 rods wide?

7. If $.3\frac{3}{4}$ of a ton of coal is worth $2.40, how many tons will cost $80?

8. A man gave $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{6}$ of his property to his three children and had $24000 left. How much did he give to each?

9. A boy bought 4 bushels of peanuts at $1.85 a bushel and sold them at 5 cents a pint.

10. A man bought 1275 barrels of flour at $4.75 a barrel. He sold part of it at $4.90 a barrel, receiving $3430 for it, and the remainder at $5.25 a barrel.

11. Write a receipt that you should give for the payment of part of an account.

LESSON 33.

1. Divide $29.45 by $.10\frac{1}{3}$.

2. Divide $3.64 by $.004\frac{2}{3}$.

3. $162.40 $\div .20\frac{5}{7}$.

4. Find the difference between 2.12 and .08762.

5. What part of 6 rd. 4 yd. 2 ft. is 2 rd. 5 yd. 1 ft.?

6. Find the value of 14750 shingles at $4.80 per M.

7. Find the common prime factors of 2310 and 2604.

8. Reduce 8 hr. 25 min. 30 sec. to the decimal of a day.

9. At $8.80 a ton, how many pounds of straw cost $34.10?

10. Add $.74\frac{3}{4}$, $9\frac{2}{3}$, $7\frac{5}{8}$, $.4\frac{1}{4}$, $.87\frac{1}{3}$, and 7.4, and express the sum in words.

11. If $\frac{3}{4}$ of a ton of coal costs $$4\frac{1}{5}$, how man tons can be bought for $$123\frac{1}{5}$?

12. A man bought a watch for $84, which was .12 of his money. How much had he left?

13. A and B are 96 miles apart. If they travel away from each other, A 3 miles an hour and B 5 miles an hour, how far apart will they be at the end of 28 hours?

LESSON 34. **1.** Find $.10\frac{1}{3}$ of $849.60.

2. Divide $70.68 by $.10\frac{1}{3}$. **3.** $1.1118 \div .34$.

4. Reduce 2 pk. 6 qt. to the fraction of a bushel.

5. Simplify $\frac{7}{9} + \frac{11}{12} - \frac{2}{3} + \frac{11}{18} - \frac{4}{9} + \frac{5}{6} + \frac{3}{4} - \frac{1}{2} + \frac{7}{12}$.

6. Reduce .0075 of a bushel to the decimal of a quart.

7. Reduce 8 cu. yd. 13 cu. ft. 968 cu. in. to cubic inches.

8. Find the value of 785 pounds of straw at $8.30 a ton.

9. How many square inches of paper will cover a cubical box 28 inches on each edge?

10. A man paid .28 of his money for a house, .45 of it for a farm, and had $8100 left. How much did the farm cost?

11. A man has 132 acres in one farm, which is $\frac{4}{7}$ of the number of acres in his other farm. How many acres has he in both farms?

12. A cellar is 42 ft. long and 36 ft. wide inside the wall. If the wall is 9 ft. high and 2 ft. thick, how many cubic yards of masonry are there in it?

LESSON 35. **1.** Find $.12\frac{1}{2}$ of $782.42.

2. Multiply $\frac{5}{8}$ of $\frac{3}{7}$ of 11 by $\frac{3}{11}$ of $\frac{8}{3}$ of $3\frac{1}{2}$.

3. Reduce $\frac{13}{17}$, $4\frac{11}{2500}$, and $\frac{17}{80000}$ to decimals.

4. Reduce 8 cwt. 64 lb. to the decimal of a ton.

5. Reduce $\frac{13}{15}$ of a Troy pound to lower denominations.

6. What part of 5 wk. 4 da. 16 hr. is 2 wk. 5 da. 18 hr.?

7. At $.85 a hundred, how many oysters are worth $12.58?

8. Divide $\frac{35}{36}$ of $\frac{4}{7}$ of 8 times $\frac{3}{5}$ by $\frac{14}{15}$ of $\frac{5}{21}$ of $1\frac{1}{3}$ times $9\frac{3}{4}$ times $\frac{6}{13}$.

9. The sum of two numbers is 704, and one of them is $2\frac{1}{5}$ times the other. Find the numbers.

10. The divisor and quotient are each 458, and the remainder is 347. What is the dividend?.

11. What is the average price of 48 acres of land, if 22 acres of it cost $96 an acre and the remainder $144 an acre?

12. Six men agree to expend the same amount in the purchase of land, paying $25, $27, $40, $75, $80, and $120 an acre respectively. What is the least number of acres that all can buy?

13. Make a bill for 8 articles bought at a drug store to-day and receipt it for the proprietor.

LESSON 36.

1. Find .24 of $1274.75.

2. Reduce 246383 in. to higher denominations.

3. Reduce .975 of a gallon to quarts and pints.

4. Find the difference between .00873 and .0231.

5. Reduce $\frac{4}{50}$ of a pint to the decimal of a gallon.

6. Find the value of 4184 fence-pickets at $3.45 per C.

7. Add $.7\frac{1}{8}$, $6\frac{2}{3}$, .737, $\frac{5}{8}$, $.9\frac{1}{3}$, 8.745, and $.8\frac{4}{5}$, and express the sum in words.

8. If $.4\frac{2}{5}$ of a ton of hay is worth $6.82, what is the value of $4\frac{1}{2}$ tons?

9. A merchant bought $112\frac{3}{4}$ yards of silk and sold $57\frac{11}{12}$ yards. How many yards had he left?

10. Find the three smallest numbers of which 61 and 81 are exact divisors.

11. If a man spends $\frac{2}{3}$ and $\frac{1}{4}$ of his money and has $16.85 left, how much money had he?

12. A dealer sold 438 tons of coal at $4.75 a ton and a number of tons of another kind at $5.20 a ton, receiving for all $4264.50. How many tons did he sell?

LESSON 37. **1.** Divide $163.06 by .20$\frac{2}{3}$.

2. Reduce 5.38 cwt. to the decimal of a ton.

3. Reduce $\frac{15}{17}$ of a ton to lower denominations.

4. What part of 8 bu. 3 pk. 6 qt. is 5 bu. 2 pk. 4 qt.?

5. Reduce .18, .035, .0425, and .76 to common fractions.

6. If .375 of a barrel of flour costs $2.10, how many barrels will cost $67.20?

7. A and B together have $946, and $\frac{2}{3}$ of A's money is equal to $\frac{4}{5}$ of B's. How much has each?

8. A man bought four loads of coal, weighing 2245, 2180, 2290, and 1975 pounds respectively, at $5.80 a ton.

9. How many square inches of paper will be required to cover the sides and top of a box 2 ft. long, 16 in. wide, and 14 in. high on the outside?

10. A man has 174 acres in one farm, 216 acres in another, and in a third 47 acres less than in both the others. How many acres has he in the three farms?

11. A farmer has 260 bushels of rye, 384 bushels of oats, and 416 bushels of wheat. What is the least number of bags of equal size in which he can send the grain to market without mixing it?

LESSON 38. **1.** Multiply $924 by .30$\frac{5}{7}$.

2. Multiply $147 by .10$\frac{1}{3}$. **3.** $61.38 ÷ .20$\frac{2}{3}$.

4. Reduce $\frac{3}{58}$, $\frac{11}{4000}$, and $\frac{7}{875000}$ to decimals.

5. Reduce 9 oz. 10 pwt. to the fraction of a pound.

6. Reduce 4 sq. rd. 165 sq. ft. 96 sq. in. to square inches.

7. How many brick, at $9.60 a thousand, will cost $192.48?

8. Find the number of cords in a pile of wood 16 ft. square on the ground and 12 ft. high.

9. A merchant sold goods for $2035.35 and gained $\frac{2}{7}$ as much as they cost. Find the cost.

10. A man has 347 sheep in 4 fields. There are 75 in the first, 96 in the second, and in the third the same number as in the fourth. How many are there in the third field?

11. A cellar wall is 22 ft. long and 18 ft. wide on the outside. If it is 6 ft. high and 18 in. thick, how many cubic feet of masonry does it contain?

12. Make a receipted bill for labor performed by yourself. Have as many as four items in it.

LESSON 39. 1. Find .08 of $4264.75.

2. What part of an inch is $\frac{5}{1188}$ of a rod?

3. Find the prime factors of 1110 and 8019.

4. Find the difference between 28.27 and .8472.

5. What part of £9 18 s. 8 d. is £4 12 s. 6 d.?

6. Reduce 4 yd. 2 ft. 5.25 in. to the decimal of a rod.

7. A merchant sold silk at $\$\frac{3}{4}$ a yard, receiving $\$85\frac{1}{2}$ for it.

8. Add 8.437, $5\frac{2}{3}$, $\frac{7}{8}$, $.4\frac{1}{4}$, $78\frac{3}{4}$, and $9.8\frac{1}{3}$, and express the sum in words.

9. The difference between $\frac{5}{6}$ of a number and $\frac{2}{3}$ of the same number is 442. Find the number.

10. A man bought a house for $4900, which was .35 of his money. How much money had he left?

11. A farmer sold 8790 pounds of hay at $12.50 a ton and twice as much at $14.80 a ton.

12. A has $785, B has twice as much less $86.75, and C has $90 more than three times as much as B. How much money have all?

LESSON 40. 1. Learn 1 . . . 32.

2. Divide $79.55 by .30$\frac{5}{8}$. 3. $438 × .20$\frac{5}{6}$.

4. Is $\frac{13}{21}$ greater or less than $\frac{18}{28}$, and how much?

5. Reduce 298509 sq. ft. to higher denominations.

6. Reduce $\frac{2}{3}$ of a shilling to the fraction of a pound.

7. Express .00005 of a mile as the fraction of a foot.

8. $964 + 85 \times 6 - 1728 \div 12 - (95 - \overline{45 \times 5} \div 3) \times 6$.

9. What will 45475 feet of lumber cost at $26.50 per M?

10. Find the greatest common factor of 240, 336, and 1728.

11. A man bought a house for $7500, which was $\frac{5}{12}$ of his money. How much money had he left?

12. Bought .35 of an acre of land for $56. At the same price, how many acres would cost $840?

13. Two men are 428 miles apart. If they travel toward each other, one 7 miles a day and the other 9 miles a day, how far apart will they be at the end of 18 days?

14. Write a receipt that you should receive for the payment of rent.

LESSON 41. 1. Learn 33 . . . 46.

2. Find .08$\frac{1}{4}$ of $968.48. 3. $62.04 ÷ .40$\frac{2}{7}$.

4. Reduce $8\frac{4}{13}$, $\frac{1}{12500}$, and $\frac{23}{4000}$ to decimals.

5. Reduce 6.4 gi. to the fraction of a gallon.

6. Multiply $5\frac{1}{4}$ times $\frac{5}{9}$ of 15 by $\frac{5}{7}$ of 3 times $\frac{1}{5}$ of 4.

7. Reduce $\frac{8}{13}$ of a bushel to pecks, quarts, and pints.

8. How many pounds of hay, at $16.80 a ton, cost $128.10?

9. What part of 8 sq. rd. 168 sq. ft. is 4 sq. rd. 44 sq. ft.?

10. At $8.75 a ton, how much will 4875 pounds of plaster cost?

11. A farmer sold five cows for $45, $55, $80, $125, and $175 respectively. Find the average price.

12. A man bought two farms for $20700, paying five times as much for one as he paid for the other. Find the cost of each.

13. A box 4 ft. long, 3 ft. wide, and 2 ft. 8 in. deep, inside measures, is made of 2-inch plank. How many cubic inches are there in the plank of which the box is made?

LESSON 42. 1. Learn 47 . . . 59.

2. Reduce 16 rd. 4 yd. 2 ft. 7 in. to inches.

3. Find the difference between .00748 and .0123.

4. Reduce .475 of a mile to lower denominations.

5. Reduce 22 sq. yd. to the fraction of a square rod.

6. At $\$1\frac{3}{5}$ a basket, how many baskets of peaches can be bought for $176?

7. Add $.92\frac{1}{4}$, $8\frac{2}{3}$, $58\frac{1}{2}$, $.76\frac{1}{3}$, 935.84, and $4\frac{5}{8}$, and express the sum in words.

8. A man paid $165.24 on a debt, and this was equal to .34 of what he still owed. How much was the debt?

9. If the divisor is 750, the quotient 248, and the remainder 478, what is the dividend?

10. If a number is diminished by $\frac{1}{4}$, $\frac{1}{6}$, and $\frac{1}{8}$ of itself and there is a remainder of 968, what is the number?

11. A park is 48 rods long and 32 rods wide. How many times must a man walk around it to travel 90 miles?

12. Make a bill for 9 articles bought at a grocery store to-day and receipt it for the proprietor.

LESSON 43. 1. Learn 60 . . . 70.

2. Divide .000048 by .064. 3. $\$34.56 \div .10\frac{2}{3}$.

4. Find the sum of $9\frac{1}{2}$, $18\frac{2}{3}$, $38\frac{3}{4}$, $7\frac{1}{6}$, and $6\frac{5}{6}$.

5. Find the value of 38450 pounds of iron at $18.75 a ton.

6. How many pounds of mutton, at $6.25 per C, cost $60.25?

7. Reduce 18 hr. 15 min. 50.4 sec. to the decimal of a day.

8. Reduce $\frac{3}{19360}$ of an acre to the fraction of a square yard.

9. What part of 7 gal. 3 qt. 1 pt. is 3 gal. 2 qt. 1 pt. 2 gi.?

10. The sum of two numbers is 704, and one of them is 7 times the other. Find the numbers.

11. Find the three smallest numbers of which 13, 19, and 23 are exact divisors.

12. Two men are 258 miles apart. If they travel toward each other, one 18 miles a day and the other 15 miles a day, how far apart will they be at the end of five days?

13. A cellar wall measures 28 ft. by 22 ft. on the outside. If it is 6 ft. high and 15 in. thick, how many cubic feet of masonry does it contain?

LESSON 44. 1. Learn 71 . . . 90.

2. Multiply $434 by $.10\frac{3}{7}$. 3. $\$77.50 \div .20\frac{5}{6}$.

4. Reduce $\frac{71}{12500}$, $\frac{33}{80000}$, and $\frac{11}{400}$ to decimals.

5. Reduce $\frac{4}{250}$ of an inch to the fraction of a yard.

6. Reduce 1345792 ounces to higher denominations.

7. Reduce .075 of a bushel to the decimal of a peck.

8. At $8.80 a thousand, how much will 24675 brick cost?

9. What is the difference between the greatest common divisor of 319 and 1450 and their least common multiple?

10. A man lost $16500 and had $\frac{1}{14}$ of his money left. How much had he left?

11. Find the number of square feet in the sides and bottom of a cistern 9 feet square and $6\frac{1}{2}$ feet deep.

12. A merchant bought flour for $4976. He sold it for $5909 and gained $.75 a barrel. Find the cost per barrel.

13. A man worked $16\frac{3}{4}$ days, and after paying $\frac{3}{8}$ of his earnings for board, he had $33.50 left. How much did he receive a day?

LESSON 45.

1. Learn 91 . . . 104.

2. Divide $655.08 by $.70\frac{2}{3}$.

3. $728 × $.20\frac{5}{7}$.

4. What part of an hour is $\frac{5}{1344}$ of a week?

5. Find the difference between .23 and .00728.

6. What part of 5 A. 70 sq. rd. is 3 A. 120 sq. rd.?

7. Reduce .144 of a quart to the decimal of a bushel.

8. At $13.60 per M, how many feet of lumber are worth $544.34?

9. Add 49.57, $7.6\frac{3}{4}$, $74\frac{3}{8}$, $9\frac{2}{3}$, $.65\frac{4}{5}$, and $63\frac{1}{3}$, and express the sum in words.

10. If I buy 844 sheep at $4.25 a head, at what price per head must I sell them to gain $1055?

11. A man sold seven loads of hay, each load weighing 2270 pounds, at $14.75 a ton.

12. How many 3-inch cubes are there in a stick of timber 18 ft. long and 9 by 6 inches?

13. A and B together own a farm worth $16800. A has $\frac{3}{4}$ as much invested as B. How much has each invested in the farm?

LESSON 46. 1. Learn 105 . . . 119.

2. Divide $724.16 by $.10\frac{1}{3}$. 3. $450 × $.30\frac{5}{6}$.

4. Find the G. C. D. of 693, 736, and 1197.

5. Reduce 7 s. 6 d. to the fraction of a pound.

6. Reduce $\frac{13}{15}$ of an acre to lower denominations.

7. Reduce 22 sq. rd. 24 sq. yd. 8 sq. ft. to square feet.

8. $942 + 94 \times 7 - (246 + 324) - (\overline{75 \times 8} \div 3 + 467)$.

9. Find the greatest common factor of 900, 1764, and 1908.

10. Reduce .65, .00015, .0625, and .525 to common fractions.

11. If $.8\frac{2}{3}$ of an acre of land costs $147, how many acres can be bought for $2800?

12. A man spent $\frac{1}{3}$ of his money for a horse, $\frac{2}{5}$ of it for a carriage, and had $224 left. How much did the horse and carriage cost?

13. A man bought 8 horses at $125 a head and 17 at $175 a head. He sold them all at $165 a head. How much did he gain or lose per head?

14. Make a bill for 8 articles bought at a dry goods store at different times and receipt it as the proprietor.

LESSON 47. 1. Learn 120 . . . 129.

2. Divide $366 by $.20\frac{1}{3}$. 3. $96 × $.40\frac{5}{6}$.

4. Reduce $\frac{11}{95}$, $\frac{13}{12500}$, and $\frac{17}{8000}$ to decimals.

5. What part of 8 cwt. 75 lb. is 3 cwt. 50 lb.?

6. Reduce 18 s. $5\frac{3}{4}$ d. to the decimal of a pound.

7. Reduce $\frac{5}{11}$ of an acre to lower denominations.

8. Express .64 of a pint as a decimal of a bushel.

9. Reduce .95 of a gallon to lower denominations.

10. The sum of two numbers is 693, and one of them is $\frac{4}{5}$ of the other. Find the numbers.

11. Find the value of a car-load of coal, weighing 38750 pounds, at $5.75 a ton.

12. How many times will a wheel 12 feet in circumference revolve in going 8 miles?

13. A farmer sold 36 barrels of apples at $2.50 a barrel, and potatoes at $.75 a bushel, receiving for all $198. How many bushels of potatoes did he sell?

14. A grocer wishes to buy tea at 56, 63, and 72 cents a pound and to expend the same sum for each kind. What is the least sum that he can expend?

15. Write a receipt that you should give for the payment of an account in full.

LESSON 48. 1. Learn 130 . . . 145.

2. What part of a yard is $\frac{3}{7040}$ of a mile?

3. Find the difference between .000675 and .0045.

4. Reduce 468341 inches to higher denominations.

5. Reduce 72$\frac{3}{5}$ sq. ft. to the fraction of a square rod.

6. What cost 7286 pounds of beef at $8.75 a hundred?

7. At \$$\frac{2}{5}$ a pound, how many pounds of tea can be bought for \$9$\frac{4}{5}$?

8. Add 9$\frac{5}{8}$, .372, 44$\frac{2}{3}$, 9$\frac{4}{5}$, .7$\frac{3}{5}$, 55$\frac{1}{3}$, and 8.47, and express the sum in words.

9. How many 3-inch squares are there in a roll of paper 40 yards long and 4 feet wide?

10. How many 2-inch cubes are there in a cube of marble one yard on each edge?

11. What is the average price of 50 barrels of pears, if 34 barrels of them are sold at $4.50 a barrel and the remainder at $5.50 a barrel?

12. A man bought a house for $8400, which was $\frac{7}{13}$ as much as he paid for a store. How much did he pay for both?

LESSON 49.

1. Learn 146 . . . 163.

2. Divide $175.20 by .10$\frac{3}{7}$.

3. $384 × .20$\frac{5}{6}$.

4. Reduce $\frac{13}{750}$, $\frac{87}{12500}$, and $\frac{51}{8000}$ to decimals.

5. Reduce .025 of a day to the decimal of an hour.

6. At $4.80 a ton, how many pounds of coal cost $45?

7. What is the value of 95 pounds of hay at $18.75 a ton?

8. What part of 8 lb. 10 oz. 18 pwt. is 5 lb. 8 oz. 14 pwt.?

9. Reduce 2.42 square yards to the fraction of a square rod.

10. If the divisor and quotient are each 476 and the remainder 374, what is the dividend?

11. My house and lot cost $9800, the house costing 3$\frac{2}{3}$ times as much as the lot. Find the cost of each.

12. A man sold 128 sheep at $6.25 a head and a number of others at $6.50 a head, receiving $1359 for all. How many did he sell?

13. The inside measurements of a cellar wall are 36 ft., 28 ft., and 8 ft. If the wall is 2 ft. thick, how many cubic yards of masonry are there in it?

TO THE TEACHER. — Teach 164 . . . 166.

LESSON 50.

1. Learn 130 . . . 163.

2. Reduce $\frac{3}{4}$ of a foot to the decimal of a rod.

3. Reduce 4 hr. 40 min. to the decimal of a day.

4. Reduce $\frac{1}{1126}$ of a rod to the decimal of a foot.

5. Reduce .946 of an acre to lower denominations.

6. How many cords of wood are there in a cubical pile that measures 16 feet each way?

7. The difference between $\frac{1}{3}$ of a number and $\frac{1}{4}$ of the same number is 106. What is the number?

8. A man sold 810 pounds of hops, which was .45 of his whole crop. How many pounds had he left?

9. A man paid me $135.60, which was $45.20 less than he still owed me. What part of the debt remained unpaid?

10. After a farmer had sold .34 of his wheat, he had 495 bushels left. How much would he have received for his whole crop at $.88 a bushel?

11. There are 946 pupils in a school. If $\frac{2}{3}$ of the number of girls is equal to $\frac{4}{5}$ of the number of boys, how many are there of each?

12. A boy bought peaches, paying 2 cents for 4, and sold them at the rate of 3 for 5 cents, thereby gaining $2.17. How many did he buy?

13. A man bought two pieces of land, paying $2\frac{2}{3}$ times as much for the first piece as he paid for the second. If the second piece cost $3750 less than the first, how much did both cost?

To the Teacher. — **Teach 164 . . . 166.**

SIXTH GRADE—THIRD TERM.

LESSON 1.

1. Learn 164 . . . 166.

2. Simplify $\frac{4\frac{2}{3} - 1\frac{5}{6}}{8.5}$.

3. $\frac{4\frac{4}{5} + 3.7}{34}$.

4. What number added to $58\frac{5}{6}$ will give $116\frac{3}{4}$?

5. What part of 4 lb. 8 oz. is 1 lb. 10 oz. 12 pwt.?

6. What part of a pound Avoirdupois is a pound Troy?

7. How many pounds of beef, at $6.40 per C, cost $55.36?

8. A floor containing 252 sq. ft. is 14 ft. wide. How long is it?

9. A piece of paper containing 6 sq. ft. is 9 in. wide. How long is it?

10. Find the area of a square field whose sides are 60 rods in length.

11. How much will 745 bushels of potatoes cost at the rate of $6 for 8 bushels?

12. At $\$1.12\frac{1}{2}$ a day, how many days must a man work to pay for 3 tons of coal at $6.75 a ton?

13. If 4 is added to both terms of the fraction $\frac{5}{7}$, how much is the fraction increased or diminished?

14. Add 12 A. 90 sq. rd. 15 sq. yd. 8 sq. ft. 118 sq. in., 19 A. 29 sq. yd. 6 sq. ft. 129 sq. in., and 15 A. 150 sq. yd. 115 sq. in.

TO THE TEACHER. — Teach 167 and 168.

LESSON 2.

1. Learn 164 . . . 168.

2. Simplify $\frac{7\frac{1}{4} \div (2\frac{1}{2} + 1\frac{1}{8})}{(3\frac{1}{5} + 3\frac{1}{2}) \times 1\frac{1}{9}}$.

3. 2331 ÷ .63.

4. .000168 ÷ .035.

5. A field containing 15 acres is 40 rods wide. How long is it?

6. Find the smallest number that is exactly divisible by 338, 364, and 448.

7. Subtract 5 fur. 29 rd. 4 yd. 1 ft. 8 in. from 2 mi. 3 fur. 16 rd. 2 yd. 5 in.

8. How many cubic feet of air are there in a room 35 ft. long, 26 ft. wide, and 14 ft. high?

9. A can saw a pile of wood in 6 days, and B can do it in 4 days. In how many days can both do the work?

10. A block of granite contains 4752 cu. in. If it is 18 in. wide and 11 in. thick, how long is it?

11. If A can do a piece of work in 7 days and B can do it in 9 days, in how many days can both do it?

12. How many bushels of potatoes will be required to plant 7 A. 128 sq. rd., allowing 7 bu. 3 pk. 6 qt. to an acre?

13. A man bequeathed his property, valued at $140000, as follows: .35 to his wife, .25 to his daughter, and the remainder equally to his two sons.

LESSON 3.

1. Reduce $287.65 to English money

2. Simplify $\frac{\frac{3}{5} \times 1.25}{6\frac{3}{4} - 4.25}$.

3. $\frac{6\frac{3}{4} \times \frac{8}{9}}{3\frac{3}{7} \times \frac{35}{12}}$.

4. Find the cost of 8760 shingles at $3.40 a thousand.

5. Divide 7.5075 by $\frac{1}{8}$, and express the quotient in three different ways.

6. Add 17 mi. 2 yd. 2 ft. 11 in., 114 mi. 306 rd. 4 yd. 9 in., and 98 mi. 127 rd. 1 ft. 9 in.

7. A grocer bought flour at $\$4\frac{3}{4}$ a barrel, paying $\$80\frac{3}{4}$ for it. How many barrels did he buy?

8. How many cubic feet of water are there in a cistern 16 ft. long and 13 ft. 6 in. wide, if the water is 11 ft. deep?

9. The difference between $\frac{6}{7}$ of a fraction and $\frac{3}{5}$ of the same fraction is $\frac{9}{49}$. What is the fraction?

10. A block of wood is 6 inches square at the ends. How long must it be to contain 2592 cubic inches?

11. How many yards of carpet one yard wide will be required for a room 16 ft. long and 14 ft. wide, if the strips run lengthwise and there is a waste of one foot on each strip in matching? How many yards will be required, if the strips run across the room?

12. Suppose you owe $28.56 at a market and pay it to-day. Write the receipt that you should receive.

LESSON 4. 1. Learn 164 . . . 168.

2. Multiply £9 15 s. 8 d. by 7.

3. Reduce $\frac{9}{16}$, $\frac{17}{2500}$, and $\frac{51}{2000}$ to decimals.

4. What part of 1 cwt. 45 lb. 2 oz. is 96 lb. 12 oz.?

5. At $9.60 a ton, how much will 3480 pounds of plaster cost?

6. How long a piece of paper 4 ft. wide will make 220 square yards?

7. If 5 is subtracted from both terms of the fraction $\frac{7}{11}$, how much is the fraction increased or diminished?

8. A can do a piece of work in 4 days, B in 6 days, and C in 8 days. In how many days can all do it?

9. At $65 an acre, what is the value of a rectangular farm 240 rods long and 88 rods wide?

10. At $4.50 a cord, how much will a pile of wood cost that is 27 ft. long, 8 ft. wide, and 6 ft. high?

11. A cellar is 38 ft. long and 28 ft. wide inside the wall. If the wall is 8 ft. high and 18 in. thick, how many cubic yards of masonry does it contain?

12. A roll of wall paper 8 yd. long and 18 in. wide costs $.85. What will this paper cost for the four walls of a room 20 ft. x 16 ft. x 10 ft., no allowance being made for openings?

To the Teacher. — Teach 169.

LESSON 5. 1. Learn 164 . . . 169.

2. Change £75 15 s. 6 d. to United States money.

3. Multiply $5\frac{1}{4}$ times $\frac{5}{9}$ of 15 by $\frac{5}{7}$ of 3 times $\frac{1}{5}$ of 3.

4. Reduce 16 lb. Avoirdupois to Apothecaries' weight.

5. Find the time from Sept. 28, 1875, to May 12, 1887.

6. A field 30 rods wide contains $4\frac{1}{2}$ acres. How long is it?

7. Paid $10.85 for coal at $6.20 a ton. How many pounds did I buy?

8. A tank holds 270 gallons. If it is 4 ft. long and 3 ft. wide, how deep is it?

9. If a man can travel 14.8 miles in .8 of a day, how far can he travel in 6.5 days?

10. A man bought a watch for $48, which was $\frac{6}{11}$ of his money. How much money had he left?

11. How many spoons, each weighing 1 oz. 8 pwt., can be made from 4 lb. 2 oz. 8 pwt. of silver?

12. Add 71 A. 148 sq. rd. 27 sq. yd. 131 sq. in., 121 sq. rd. 21 sq. yd. 3 sq. ft. 19 sq. in., 15 A. 68 sq. rd. 6 sq. ft. 111 sq. in., and 3 A. 25 sq. yd. 8 sq. ft. 87 sq. in.

13. Make a bill for 12 articles bought at a grocery store at different times and receipt it for the proprietor.

LESSON 6.

1. Learn 164 . . . 169.

2. Simplify $\frac{\frac{1}{5} \times 1.25}{.5 + \frac{3}{8}}$.

3. 45880 ÷ .86.

4. 1.1118 ÷ .34.

5. Divide 48 bu. 2 pk. 7 qt. by 5.

6. Add $9\frac{3}{4}$, $\frac{7}{8}$, $.8\frac{4}{5}$, $6\frac{3}{5}$, $.4\frac{1}{3}$, 7.6, and $48\frac{2}{3}$.

7. Change $\frac{3}{7}$, $\frac{20}{28}$, $\frac{6}{7}$, and $\frac{36}{63}$ to forty-ninths.

8. If $\frac{5}{8}$ of a yard of ribbon costs $\$\frac{7}{8}$, what is the value of $5\frac{4}{7}$ yards?

9. How much will 86 acres 6 square chains of land cost at $48.50 an acre?

10. A note was dated Nov. 18, 1882, and paid June 4, 1888. How long did it run?

11. How many gallons will a tank hold that is 6 ft. long, 5 ft. wide, and 4 ft. deep?

12. A can build a wall in $4\frac{1}{2}$ days, and B can build it in 3 days. In how many days can both build it?

13. A pile of wood is 4 ft. wide and 8 ft. high. How long must it be to contain $8\frac{1}{2}$ cords?

14. The difference between two numbers is 351, and the greater number is 5 times the smaller. Find the numbers.

To the Teacher. — Teach 170 . . . 172.

LESSON 7.

1. Learn 164 . . . 172.

2. $\frac{(\frac{3}{4} \times \frac{5}{9}) \div (\frac{5}{8} \times \frac{3}{4})}{(5\frac{1}{2} \div 4\frac{2}{5}) \times \frac{4}{10}}$.

3. $48\frac{1}{2} + 56\frac{3}{4} + 49\frac{6}{7}$.

4. $42\frac{1}{3} - (32\frac{1}{6} - 17\frac{2}{3})$.

5. Find the time from Dec. 23, 1879, to April 17, 1886.

6. What part of 8 cu. yd. 12 cu. ft. is 6 cu. yd. 18 cu. ft.?

7. A board 18 ft. long contains 12 sq. ft. How wide is it?

8. At 3 cents a pound, how much will 4 barrels of flour cost?

9. How many board feet are there in a board 18 ft. long, 10 in. wide, and 1 in. thick?

10. What number contains all the prime factors of 51, 90, and 75, but no others?

11. How many board feet are there in a stick of timber 26 feet long and 8 x 10 inches?

12. How many rods of fence will enclose a rectangular field 48.75 rods long and 28.25 rods wide?

13. Find the number of board feet in 4 joists, each 18 ft. long, 9 in. wide, and 3 in. thick.

14. Add 7 mi. 49 rd. 3 yd. 1 ft. 7 in., 7 rd. 1 yd. 3 in., 1 mi. 1 yd. 5 in., 15 mi. 139 rd. 1 yd. 2 ft. 9 in., 91 mi. 47 rd. 1 ft., and 217 rd. 1 yd. 1 ft. 3 in.

To the Teacher. — Show that when the sum and difference of two numbers are given, the greater number may be found by adding half the sum to half the difference.

LESSON 8. 1. Express $418.75 in English money.

2. Subtract 8 sq. yd. 126 sq. in. from 2 sq. rd. 7 sq. ft.

3. Reduce .35, .0875, .065, and .86 to common fractions.

4. At $22.75 per M, how many feet of lumber can be bought for $147.42?

5. A farmer sold six loads of hay, each load weighing 2345 pounds, at $16.80 a ton.

6. How many board feet are there in a plank 16 ft. long, 9 in. wide, and 2½ in. thick?

7. The sum of two numbers is 948, and their difference is 426. Find the two numbers.

8. If 7 is added to both terms of the fraction ⅔, how much is the fraction increased or diminished?

9. A block of marble contains 8640 cu. in. If it is 4 ft. long and 18 in. wide, how thick is it?

10. How many board feet are there in a stick of timber 36 ft. long and 10 in. square at the ends?

11. A farmer has 78 sheep in one field, which is $\frac{3}{5}$ as many as he has in another field. How many sheep has he?

12. Find the cost of a carpet $\frac{3}{4}$ of a yard wide, at $1.75 a yard, for a room 15 ft. long and 13 ft. wide, if the strips run lengthwise, allowing 6 in. waste on each strip in matching. Find the cost, if the strips run across the room.

LESSON 9. **1.** Multiply 248\frac{3}{4}$ by .24.

2. Reduce $\frac{65}{8}$, $\frac{19}{25}$, $\frac{27}{4}$, $\frac{11}{50}$, and $\frac{29}{5}$ to decimals.

3. Find the number of pennyweights in a pound Avoirdupois.

4. At \$$\frac{4}{5}$ a yard, how many yards of silk can be bought for $144?

5. A piece of ground contains 8250 sq. ft. If it is 55 ft. wide, how long is it?

6. At $16 per M, how much will 250 planks cost, each one being 16 ft. long, 9 in. wide, and 2 in. thick?

7. How many cubic inches are there in a stick of timber 6 inches square at the ends and 16 feet long?

8. A can do a piece of work in 8 hours, and C can do it 6 hours. In how many hours can both do it?

9. Add 91 A. 31 sq. rd. 4 sq. yd. 2 sq. ft. 96 sq. in., 89 A. 131 sq. rd. 27 sq. yd. 3 sq. in., and 214 A. 15 sq. rd. 4 sq. ft.

10. A farmer sold .24 of his wheat to one man, .44 of it to another, and had 272 bushels left. Find the value of his whole crop at $.86 a bushel.

9. Find the time from Aug. 14, 1881, to Oct. 27, 1889.

10. At $\$\frac{3}{8}$ a yard, what part of a yard of ribbon can be bought for $\$\frac{3}{16}$?

11. The sum of two numbers is 835, and one of them is 4 times the other. Find the numbers.

12. How many half-inch cubes are there in a block one foot long, 7 in. wide, and 4 in. thick?

13. If 6 is subtracted from both terms of the fraction $\frac{13}{17}$, how much is the fraction increased or diminished?

14. A cellar wall is 40 ft. long and 30 ft. wide on the outside. If it is 7 ft. high and 2 ft. thick, how many cubic yards of masonry does it contain?

15. How many yards of carpet 27 in. wide will be required for a room 18 ft. 4 in. long and 15 ft. wide, if the strips run lengthwise and there is a waste of 1 ft. on each strip in matching? How many yards will be required, if the strips run across the room?

LESSON 13.

1. Learn 71 . . . 90.

2. Simplify $\frac{5.8 \times 6\frac{1}{2} - 7.7}{40\frac{2}{3} - (28.8 - 3.1\frac{1}{3})}$.

3. $4\frac{1}{4} + 5.5 \div 4\frac{8}{9}$.

4. $8\frac{7}{8} - (5 - .375)$.

5. Reduce 42 lb. Troy to Avoirdupois weight.

6. Find the greatest common factor of 1088 and 945.

7. Simplify $\frac{9}{10} + \frac{3}{4} - \frac{2}{3} - \frac{3}{5} + \frac{13}{15} + \frac{17}{20} - \frac{5}{6} + \frac{7}{10} + \frac{4}{5}$.

8. How many pounds of hay, at $23 a ton, cost $90.16?

9. What part of 16 sq. rd. 24 sq. yd. is 12 sq. rd. 18 sq. yd.?

10. A garden contains $\frac{3}{8}$ of an acre. If it is 121 feet wide, how long is it?

11. Add 120 rd. 7 yd. 5 in., 240 rd. 1 ft. 8 in., 8 yd. 1 ft. 9 in., and 180 rd. 5 yd. 8 in.

12. How many board feet are there in 140 scantlings, each 3 by 4 inches and 14 feet long?

13. A pile of wood is 28 ft. long, 18 ft. wide, and 14 ft. high. How many cords does it contain?

14. A can do a piece of work in five days, B in 6 days, and C in 10 days. In how many days can all do it?

15. A has twice as many sheep as C, and B has four times as many as C. If all have 595, how many has each?

LESSON 14. **1.** Learn 91 . . . 104.

2. Divide 1190 by .034. **3.** 7.34 ÷ .86.

4. Reduce £145 5 s. 8 d. to United States money.

5. Find the exact number of days from May 12 to Dec. 17 of the same year.

6. Find the smallest number that is exactly divisible by 84, 336, and 472.

7. A cistern is 10 feet square. If it holds 185 barrels of water, how deep is it?

8. Subtract 3 A. 24 sq. rd. 19 sq. yd. 7 sq. ft. 94 sq. in. from 7 A. 46 sq. rd. 12 sq. yd. 42 sq. in.

9. If .375 of a yard of silk costs $1.20, how many yards will cost $51.60?

10. A is 6 times as old as B, and the difference between their ages is 65 years. How old is each?

11. At $135 an acre, what is the value of a rectangular piece of ground 35 chains long and 18 chains wide?

12. A farmer sold $\frac{1}{2}$ of his wheat to one man, $\frac{1}{3}$ to another, and had 168 bushels left. How much did he raise?

13. A roll of wall paper 8 yd. long and 18 in. wide costs $1.25. How much will this paper cost for the four walls of a room 24 ft. x 18 ft. and 9 ft. high, no allowance being made for openings?

LESSON 15.

1. Learn 105 . . . 119.

2. Add $\frac{2}{3}$, $9\frac{3}{8}$, $.5\frac{3}{5}$, 7.85, $.06\frac{1}{3}$, $9\frac{3}{4}$, and 4.7.

3. Find the common prime factors of 693 and 1323.

4. At $28.40 per M, how much will 28465 feet of lumber cost?

5. At $18 a thousand feet, how much will 75 joists cost, each 24 ft. long and 8 by 3 in.?

6. How many barrels of water will a cistern hold that is 10 ft. square and 8 ft. deep?

7. How far must a man travel to walk around a square field 57.75 rods on each side?

8. There are 20 sq. yd. of blackboard in a school-room. If it is 45 ft. long, how wide is it?

9. If $\frac{3}{8}$ of an acre of land is worth $$73\frac{1}{2}$, how much is the remainder worth at double the rate?

10. A and B can do a piece of work in 12 days, and A can do it alone in 20 days. In how many days can B do it?

11. Add 125 sq. rd. 28 sq. yd., 98 sq. rd. 25 sq. yd. 6 sq. ft. 112 sq. in., 116 sq. rd. 21 sq. yd. 72 sq. in., and 119 sq. rd. 20 sq. yd. 8 sq. ft. 68 sq. in.

12. Make a bill for six articles bought at a shoe store at different times and receipt it for the proprietor.

LESSON 16.

1. Learn 105 . . . 119.

2. Simplify $\dfrac{(.7+\frac{1}{2})\times 4.5}{6.45-(4.9-\frac{1}{4})}$.

3. $18-(3\frac{3}{4}-2.864)$.

4. $7\frac{2}{3}+\frac{7}{8}+9.8+.5\frac{1}{3}$.

5. Reduce $\frac{3}{5}$, $\frac{28}{35}$, $\frac{5}{9}$, and $\frac{56}{63}$ to 45ths.

6. Reduce $728.75 to English money.

7. Multiply 48 sq. rd. 28 sq. yd. 7 sq. ft. by 7.

8. What part of 8 A. 120 sq. rd. is 5 A. 80 sq. rd.?

9. Find the value of 985 pounds of straw at $8.40 a ton.

10. If a note, dated April 1, 1890, is paid to-day, how long has it run?

11. A shed is 14 feet square. How high must wood be piled in it to make $18\frac{3}{4}$ cords?

12. A and B together have 614 acres of land, and A has 242 acres more than B. How many acres has each?

13. How much will it cost to excavate a cellar 38 ft. long, 27 ft. wide, and 8 ft. deep, at $.45 a cubic yard?

14. How many yards of carpet one yard wide will be required for a room 28 ft. long and 21 ft. wide, if the strips run lengthwise and there is a waste of 9 in. on each strip in matching? How many yards will be required, if the strips run across the room? Find the cost of each at $1.45 a yard.

LESSON 17.

1. Learn 130 . . . 145.

2. Simplify $\dfrac{4\frac{2}{3} \div 5\frac{3}{5}}{\dfrac{12}{1\frac{1}{5}} - \dfrac{15}{2}}$.

3. $35.8 - 6\frac{3}{4} \times 4.4$.

4. $62\frac{3}{4} - (18\frac{1}{3} - 4\frac{3}{4})$.

5. Reduce 18 lb. 7 oz. Apothecaries' weight to Avoirdupois weight.

6. At $6.80 a hundred, how many pounds of mutton can be bought for $83.30?

7. If $\frac{4}{7}$ of a piece of silk is worth $95, how much is the other part worth?

8. How many 2-inch cubes are there in a stick of timber 8 by 6 inches and 4 feet long?

9. Add 180 rd. 4 yd. 11 in., 4 yd. 2 ft. 9 in., 268 rd. 5 yd. 6 in., and 4 yd. 1 ft. 2 in.

10. A has $385, which is equal to .44 of B's money. How much money have both?

11. How many board feet are there in 65 boards, each 18 ft. long, 10 in. wide, and $\frac{1}{2}$ in. thick?

12. If 2 is added to both terms of the fraction $\frac{6}{7}$, how much is the fraction increased or diminished?

13. At $.45 a square yard, it cost $19.80 to plaster a ceiling. If the room is 22 ft. long, how wide is it?

14. If A can do half a piece of work in 6 days and B can do the whole of it in 8 days, in how many days can both do it?

LESSON 18. 1. Learn 146 . . . 163.

2. Divide .00024 by .032. 3. 9.23 ÷ .45.

4. Divide 121 sq. rd. 18 sq. yd. 7 sq. ft. by 8.

5. Change £145 15 s. 8 d. to United States money.

6. What part of a 9-inch square is 9 square inches?

7. Reduce .075, .00025, and .033$\frac{1}{3}$ to common fractions.

8. What prime numbers multiplied together will give 459 and 2375?

9. How much will it cost to pave a court 184 feet square, at 8 cents a square yard?

10. Find the exact number of days from Jan. 4, 1892, to July 28 of the same year.

11. If a room is 14 feet square, how high must it be to contain 2058 cubic feet of air?

12. The sum of two fractions is $\frac{5}{8}$, and one of them is 2$\frac{3}{4}$ times the other. Find the fractions.

13. How many bushels of oats will be required to sow 7 A. 96 sq. rd., allowing 3 bu. 1 pk. 4 qt. to an acre?

14. If I should sell some sheep at $7.50 a head, I would gain $150; but if I should sell them at $6.50 a head, I would lose $100. How much did I pay for them?

LESSON 19.

1. Learn 164 . . . 172.

2. Reduce $\frac{1}{3}$, $7\frac{3}{4}$, $\frac{17}{18}$, $8\frac{4}{5}$, and $3\frac{2}{8}$ to decimals.

3. What part of 6 rd. 4 yd. 2 ft. is 2 rd. 5 yd. 1 ft.?

4. Find the greatest common factor of 768 and 5184.

5. At $5.88 a barrel, how many pounds of flour can be bought for $2.64?

6. Divide 187.50001875 by $\frac{3}{8}$, and express the quotient in three different ways.

7. What number contains each of the prime factors of 28, 30, and 34, but no others?

8. At $16 a thousand, what will 85 2-inch planks cost, each 16 ft. long and 8 in. wide?

9. Add 14 A. 135 sq. rd. 184 sq. ft. 125 sq. in., 9 A. 259 sq. ft. 73 sq. in., and 150 sq. rd. 112 sq. ft. 68 sq. in.

10. The four sides of a bin contain 168 sq. ft. If the bin is 8 ft. long and 6 ft. wide, how deep is it?

11. At 55 cents a cubic yard, what will it cost to excavate a cellar 42 ft. long, 30 ft. wide, and 8 ft. deep?

12. A yard 100 feet square is inclosed by a wall 8 feet high and 2 feet thick. How many cubic yards of masonry are there in the wall?

13. Suppose you pay your grocer $18.50 on account. Write the receipt that you should receive.

LESSON 20.

1. Divide $167.325 by $.20\frac{5}{7}$.

2. Simplify $\dfrac{.06 + .3\frac{2}{3}}{3\frac{1}{5} - 2\frac{1}{2}}$.

3. $46\frac{3}{4} - 4\frac{3}{8} \times 4.4$.

4. $22\frac{2}{3} - (6.8 - .375\frac{1}{3})$.

5. Find the time from Oct. 14, 1492, to the present time.

6. What is the difference between 24 mi. and 22 mi 96 rd. 2 yd. 2 ft.?

7. How many half-inch cubes are there in a piece of wood 2 ft. long and 4 in. square at the ends?

8. Bought four loads of coal, weighing 2265, 1890, 2185, and 2360 pounds respectively, at $6.45 a ton.

9. If 4 is subtracted from both terms of the fraction ⅚, how much is the fraction increased or diminished?

10. How many times is the greatest common divisor of 484 and 1146 contained in their least common multiple?

11. At $.85 a square yard, find the cost of cementing a cistern 14 ft. long, 10 ft. wide, and 7 ft. deep.

12. If I put ½ of my money in one bank, ¼ in another, ⅕ in another, and have $4200 besides, how much have I?

13. A and B can do a piece of work in 15 days, and B can do it alone in 25 days. In how many days can A do it?

14. Make a bill for eight articles bought at a stove and hardware store at different times and receipt it as the proprietor.

LESSON 21. 1. Multiply $385 by .07½.

2. Reduce $840 to English money.

3. Reduce 7 lb. 10 oz. Avoirdupois to Troy weight.

4. Find the common prime factors of 2310 and 2541.

5. What is the capacity of a bin 14 ft. square and ten feet deep?

6. A farmer sold 35 bushels of clover-seed, receiving $227½ for it.

7. Add 190 rd. 5 yd. 10 in., 3 yd. 2 ft., 164 rd. 4 yd. 9 in., and 3 yd. 1 ft. 2 in.

8. How many board feet are there in 5 sticks of timber, each 28 feet long and 6 by 4 inches?

9. Bought a load of coal at $6.40 a ton, paying $7.84 for it. How many pounds did I buy?

10. What is the length of a rectangular piece of ground five rods wide, if it contains one acre?

11. How many silver coins, each weighing $412\frac{1}{2}$ grains, can be made from silver weighing 24 lb. 12 oz. Avoirdupois?

12. A man owning $\frac{4}{7}$ of a mill, sold $\frac{2}{3}$ of his share to B, and $\frac{5}{6}$ of what he then owned to C for $680. What did B pay for his share, and what was the value of the mill?

LESSON 22. **1.** Multiply 11 bu. 3 pk. 7 qt. by $\frac{11}{12}$.

2. Add $5\frac{5}{8}$, .8, $4\frac{2}{3}$, $.7\frac{1}{3}$, 8.78, 84, and $8\frac{7}{8}$.

3. What part of 5 wk. 4 da. 16 hr. is 2 wk. 5 da. 18 hr.?

4. Find the exact number of days from January first of this year to to-day.

5. A bin holds 144 bushels of wheat. If it is 6 ft. square, how deep is it?

6. A man paid 4 times as much for a farm as he paid for a house. If the farm cost $8400 more than the house, how much did he pay for both?

7. If $520 is divided between A and B so that A receives $5 as often as B receives $3, how much does each receive?

8. How many yards of carpet $\frac{3}{4}$ of a yard wide will be required for a room 17 ft. long and 13 ft. 10 in. wide, if the strips run lengthwise and there is a waste of 1 ft. on each strip in matching? How many yards will be required, if the strips run across the room? How much will the carpet cost in each case at $1.75 a yard?

9. The sides of a garden are 168, 280, 182, and 252 ft. respectively. How many boards will be needed to build a fence around it, if the fence is four boards high, using boards of the greatest length that can be used without cutting any of them? If the boards are 10 in. wide, how much will they cost at $24 per thousand feet?

LESSON 23. 1. Divide \$357.50 by $.07\frac{1}{3}$.

2. Find the cost of 24844 brick at \$9.75 a thousand.

3. At $6\frac{3}{4}$ cents a pound, how much will $84\frac{3}{4}$ pounds of sugar cost?

4. A rectangular field containing 7.4 acres is 18.5 rods wide. How long is it?

5. How many 3-inch cubes are there in a cubical block of marble 18 inches on each edge?

6. A man bought 150 half-inch boards 16 ft. long and 8 in. wide at \$26 a thousand. Find the cost.

7. At \$1.75 a rod, how much will it cost to inclose a rectangular field 45 rd. long and 462 ft. wide?

8. A lady spent $\frac{1}{4}$ of her money for a cloak, $\frac{1}{5}$ of it for a dress, and had \$60.50 left. How much did she spend?

9. A can do a piece of work in $7\frac{1}{2}$ days, B in 5 days, and C in $3\frac{1}{3}$ days. In how many days can all do it?

10. Add 18 A. 19 sq. yd. 19 sq. in., 17 sq. rd. 4 sq. yd. 8 sq. ft. 14 sq. in., 97 A. 2 sq. yd. 3 sq. ft. 11 sq. in., and 3 sq. rd. 7 sq. yd. 6 sq. ft. 9 sq. in.

11. A roll of wall paper 8 yd. long and 18 in. wide costs \$.65. How much will this paper cost for the four walls of a room 30 ft. x 24 ft. x 12 ft., deducting 265 sq. ft. for openings?

LESSON 24. 1. Reduce £400 7s. 4d. to U.S. money.

2. Reduce $\frac{73}{1600}$, $\frac{29}{800}$, and $\frac{41}{4000}$ to decimals.

3. Divide 28 cu. yd. 22 cu. ft. 448 cu. in. by 8.

4. At \$$\frac{3}{8}$ a yard, how many yards of ribbon can be bought for \$9.75?

5. If $\frac{2}{3}$ of a certain number exceeds $\frac{4}{9}$ of it by 146, what is the number?

6. How much time has elapsed since the American colonies declared their independence?

7. How many half-inch squares are there in a sheet of paper 2 yards long and 4 feet wide?

8. A cistern is to be made 12 ft. long and 8 ft. wide. How deep must it be made to hold 175 barrels of water?

9. There are 658 pupils in a school, and the number of boys is 126 less than the number of girls. Find the number of each.

10. Bought .55 of a barrel of flour for $2.97. At the same price, how many barrels would cost $31.05?

11. A cellar wall is 38 ft. long and 30 ft. wide on the outside. If it is 8 ft. high and 18 in. thick, how many cubic yards of masonry does it contain?

12. A bin 12 ft. long, 8 ft. wide, and 7 ft. deep is filled with wheat. If one bushel of wheat will make 48 pounds of flour, how many barrels of flour can be made from the wheat?

LESSON 25.

1. Divide $24.15 by .09$\frac{1}{3}$.

2. What fraction must be added to $\frac{12}{49}$ to make $\frac{29}{42}$?

3. How many brick, at $8.60 a thousand, cost $84.71?

4. At 3$\frac{1}{4}$ cents a pound, how much will 6 barrels of flour cost?

5. Find the number of drams Apothecaries' weight in one pound Avoirdupois.

6. There are 35 square yards in a roll of paper. If it is 42 yards long, how wide is it?

7. How many cubic inches are there in a cubical block of granite 2 ft. 8 in. on each edge?

8. How many board feet are there in eight pieces of timber, each 22 ft. long and 8 in. square at the ends?

9. If 3 is added to both terms of the fraction $\frac{4}{5}$, how much is the fraction increased or diminished?

10. Add 19 A. 21 sq. yd. 8 sq. ft. 139 sq. in., 117 sq. rd. 29 sq. yd. 114 sq. in., and 116 sq. rd. 15 sq. yd. 7 sq. ft. 89 sq. in.

11. A can do a piece of work in 12 days, A and C in 9 days, and A and B in 6 days. In how many days can B and C do it?

12. Suppose John Smith buys 10 articles at your store to-day and pays for them. Make a receipted bill for him.

LESSON 26. 1. Reduce $1000 to English money.

2. Simplify $\frac{6 - \frac{1}{5} \times 2.375}{\frac{3}{2} \times 1.25 + 2\frac{1}{2}}$.

3. $36\frac{2}{3} - (17\frac{1}{2} - 9\frac{2}{3})$.

4. $7.75 \times 8\frac{1}{3} - 42.375$.

5. Subtract $28\frac{3}{4}$ sq. rd. from $\frac{5}{7}$ of an acre.

6. Change $\frac{4}{7}$, $\frac{24}{28}$, $\frac{2}{9}$, and $\frac{56}{72}$ to sixty-thirds.

7. Multiply $\frac{3}{7}$ of $\frac{2}{3}$ of 13 times $\frac{17}{20}$ of $\frac{7}{11}$ by $\frac{11}{34}$ of $\frac{51}{3}$ of 2 times $\frac{2}{3}$ of 3.

8. Find the exact number of days from May 31 to December first of the same year.

9. A man paid me $189.84, which is equal to .28 of what he still owes me. How much was the debt at first?

10. How many spoons, each weighing 2 oz. 16 pwt., can be made from 17 lb. 3 oz. 4 pwt. of silver?

11. If a pile of wood is 60 ft. long and 8 ft. high, how wide must it be to contain $22\frac{1}{2}$ cords?

12. At $35 per C for the posts and $18 per M for the boards, how much will it cost to build a fence four boards high and 160 rods long, if the boards are 10 in. wide and the posts are set 8 ft. apart?

13. How many yards of carpet 27 in. wide will be required for a room 18 ft. long and 15 ft. wide, if the strips run lengthwise and there is a waste of 10 in. on each strip in matching? How many yards will be required, if the strips run across the room?

LESSON 27.

1. Divide \$734.50 by $.08\frac{2}{3}$.

2. Simplify $\dfrac{\frac{1}{2}+\frac{2}{3}+\frac{3}{4}}{\frac{1}{\frac{2}{5}}+\frac{1}{\frac{2}{3}}+\frac{1}{\frac{4}{7}}}$.

3. $84\frac{7}{8} - 7\frac{2}{3} \times 6\frac{1}{2}$.

4. $.645 + \frac{2}{3} + \frac{3}{8} + .8\frac{1}{3} + \frac{7}{8}$.

5. A farmer sold corn at $\$\frac{5}{8}$ a bushel, receiving \$352 for it.

6. How much will 9865 pounds of beef cost at \$7.15 per hundredweight?

7. Divide 7000.007 by $\frac{7}{8}$, and express the quotient in three different ways.

8. At \$1.50 a cord, what is it worth to saw a cubical pile of wood 16 ft. long?

9. If a piece of ground is 225 ft. long, how wide must it be to contain $\frac{5}{8}$ of an acre?

10. At \$19 a thousand, find the cost of 175 2-inch joists, each 22 ft. long and 6 in. wide.

11. Add 312 rd. 4 yd. 2 ft., 4 mi. 5 yd. 7 in., 19 mi. 147 rd. 2 ft. 3 in., and 5 yd. 2 ft. 9 in.

12. A and C can do a piece of work in 9 days, and A can do it alone in 15 days. In how many days can C do it?

13. Suppose you live in a rented house. On the first day of this month you paid \$22, the rent for the preceding month. Write the receipt that you should have received.

LESSON 28.

1. Multiply 27 rd. 4 yd. 2 ft. by $\frac{7}{5}$.

2. Find the time from Jan. 4, 1889, to Feb. 26, 1893.

3. What part of 8 bu. 3 pk. 6 qt. is 5 bu. 2 pk. 4 qt.?

4. Reduce .38, $.0066\frac{2}{3}$, and .00625 to common fractions.

5. A man paid \$7.59 for plaster at \$8.25 a ton. How many pounds did he buy?

6. A farmer sold 9625 pounds of hay at \$14.50 a ton and twice as much at \$16.80 a ton.

7. If 5 men can do as much as 15 boys, how much should a boy receive a day, if a man is paid \$2.25?

8. How many half-inch cubes can be cut from a board 16 in. long, 9 in. wide, and one inch thick?

9. If 8 is subtracted from both terms of the fraction $\frac{11}{15}$, how much is the fraction increased or diminished?

10. At \$.65 a square yard, how much will it cost to plaster a room 36 ft. long, 28 ft. wide, and 16 ft. high, allowing 459 square feet for windows and doors?

11. A merchant has three kinds of tea; 75 pounds of the first, 95 pounds of the second, and 135 pounds of the third. He wishes to put it up in as few equal packages as possible without mixing it. How many packages will he have?

LESSON 29. 1. Divide \$77 by $.09\frac{1}{6}$.

2. Reduce 17 lb. 5 oz. Troy to Avoirdupois weight.

3. If $\frac{2}{5}$ of a barrel of sugar is worth \$6.98, how much are 6 barrels worth?

4. A cubical bin 8 ft. deep is full of rye. How many bushels does it contain?

5. At \$16 a thousand, find the cost of 240 scantlings, each 16 ft. long and 4 by 2 inches.

6. How much wheat will be required to sow 8 A. 64 sq. rd., allowing 2 bu. 2 pk. 5 qt. to an acre?

7. At \$.85 a square yard, it cost \$112.20 to pave a walk. If the walk is 6 ft. wide, how long is it?

8. Add 141 sq. rd. 28 sq. yd. 138 sq. in., 14 A. 37 sq. yd. 7 sq. ft. 127 sq. in., 24 sq. yd. 141 sq. in., and 107 sq. rd. 12 sq. yd. 6 sq. ft.

9. A and B can do a piece of work in 8 days, A and C in 6 days, and A alone in 12 days. In how many days can B and C do it?

10. If a speculator should sell some wool at 36 cents a pound, he would gain $1600; but if he should sell it at 33 cents a pound, he would gain only $1000. How much would he receive for it at the less price?

LESSON 30. **1.** Divide 42 rd. 4 yd. 2 ft. 9 in. by $\frac{3}{7}$.

2. Add $9\frac{7}{8}$, $4\frac{2}{3}$, $.7\frac{4}{5}$, $.06\frac{1}{3}$, 84.6, $8\frac{3}{8}$, and $85\frac{3}{5}$.

3. Change £792 6s. 9d. to United States money.

4. How many acres are there in a field 44.8 rods long and 24.25 rods wide?

5. Find the exact number of days from Jan. 17, 1888, to Sept. 17 of the same year.

6. If a stick of timber is 8 by 10 in., how long must it be to contain 15 cubic feet?

7. If a cistern will hold 175 barrels of water, how many bushels of wheat will it hold?

8. A man paid $560 for a horse and carriage, paying three times as much for the horse as he paid for the carriage.

9. A man earned 5 times as much as his son. If the son earned $643 less than his father, how much did both earn?

10. How many cans 6 in. by 4 in. by 3 in. can be packed in a cubical box one yard on each edge inside measure?

11. A cellar is 42 ft. long and 36 ft. wide inside the wall. If the wall is 9 ft. high and 2 ft. thick, how many cubic yards of masonry are there in it?

12. Make a receipted bill for 12 articles bought at a market by yourself at different times.

LESSON 31.

1. Learn 47 . . . 59.

2. Simplify $\dfrac{9\frac{4}{5} - (5\frac{1}{4} - 1.45)}{.4\frac{2}{3} + 2.03\frac{1}{3}}$.

3. $46 - (17 - 9\frac{2}{3})$.

4. $.7\frac{2}{3} + \frac{5}{8} + 9\frac{1}{3}$.

5. Add $84\frac{1}{2}$, $67\frac{5}{6}$, $75\frac{5}{7}$, and $98\frac{18}{21}$.

6. What part of £9 18s. 8d. is £4 12s. 6d.?

7. How much will 18650 envelopes cost at $3.80 per M?

8. Find the capacity of a cubical cistern which is 8 ft. deep.

9. A rectangular farm containing $271\frac{7}{8}$ acres is 62.5 chains long. How wide is it?

10. How many board feet are there in 160 boards, each 16 ft. long, 9 in. wide, and $1\frac{1}{2}$ in. thick?

11. Add 147 sq. rd. 264 sq. ft. 131 sq. in., 19 A. 248 sq. ft. 129 sq. in., and 123 sq. rd. 237 sq. ft. 121 sq. in.

12. If $455 be divided between A and B so that A receives $6 as often as B receives $7, how much will each receive?

13. A man bought .35 of an acre of land for $336. How much would 4 acres cost at the same price?

14. A rectangular park is 155 rods long and 125 rods wide. How many times must a man walk around it to travel 16 miles?

LESSON 32.

1. Learn 60 . . . 70.

2. Simplify $\dfrac{4\frac{1}{2} + 2\frac{1}{2} \div \frac{3}{5}}{3\frac{3}{5} - \frac{3}{4} \times \frac{2}{3}}$.

3. $\frac{7}{8} + .8\frac{2}{3} - .37\frac{2}{3}$.

4. $8.7 - (4\frac{2}{3} - .86\frac{2}{3})$.

5. Subtract $48\frac{2}{3}$ rd. from $\frac{3}{5}$ of a mile.

6. At $9.50 a ton, what will 1734 pounds of plaster cost?

7. If a note dated March 15, 1888, is paid to-day, how long has it run?

8. If 5 is added to both terms of the fraction $\frac{3}{4}$, ho much is the fraction increased or diminished?

9. John and his father earn $156 a month. If Jol earns $35 less than his father, how much does each earn?

10. A can do a piece of work in 16 days, A and B i 12 days, and A and C in 8 days. In how many days can and C do it?

11. A granary is 20 ft. long and 16 ft. wide. There a 1280 bushels of wheat spread evenly over the floor. Ho deep is it?

12. A man sold 695 bushels of potatoes and had $\frac{2}{7}$ (his crop left. At $.55 a bushel, how much would he hav received for his whole crop?

13. How many yards of carpet one yard wide will l required for a room 24 ft. long and 19 ft. 6 in. wide, if tl strips run lengthwise and there is a waste of 1 ft. on eac strip in matching? How many yards will be required, the strips run across the room? Find the cost in each cas at $1.35 a yard.

LESSON 33. **1.** Learn 71 . . . 90.

2. Reduce $724.86 to English money.

3. What part of a pound Avoirdupois is a pound Troy

4. If a board containing 20 square feet is 16 feet lon how wide is it?

5. Paid $41.31 for peach-trees at $12.75 per C. Ho many did I buy?

6. A farmer sold $45\frac{1}{2}$ bushels of wheat for $\$36\frac{2}{5}$. Wha was the price per bushel?

7. The sum of two numbers is 2664, and one of them i 5 times the other. Find the numbers.

8. Add 7 sq. rd. 28 sq. yd. 116 sq. in., 22 sq. yd. 4 sq. ft and 9 sq. rd. 19 sq. yd. 7 sq. ft. 129 sq. in.

9. Find the number of board feet in a piece of timber 30 ft. long and 10 in. square at the ends.

10. How many cubes $1\frac{1}{2}$ inches on each edge can be cut from a stick of timber 12 by 9 in. and 6 ft. long?

11. A farmer sold 544 bushels of potatoes, which was .64 of his whole crop. How many had he left?

12. A railroad having four tracks is 16 miles long. How many rails 30 ft. long were required to build it?

LESSON 34. **1.** Learn 91 . . . 104.

2. Multiply 72 sq. rd. 18 sq. yd. 7 sq. ft. by 6.

3. Which is the greater, and how much, $\frac{23}{26}$ or $\frac{13}{39}$?

4. What part of 8 sq. rd. 168 sq. ft. is 4 sq. rd. 44 sq. ft.?

5. A tank 4 feet square holds 360 gallons. How deep is it?

6. Find the exact number of days from Feb. 24 of this year to to-day.

7. How many acres are there in a field 18 chains 75 links long and 14 chains 80 links wide?

8. After spending $\frac{2}{7}$ of my money for a watch, I find that $\frac{3}{4}$ of what I have left is $225. How much did I have at first?

9. A cellar wall is 22 ft. long and 18 ft. wide on the outside. If it is 6 ft. high and 18 in. thick, how many cubic feet of masonry does it contain?

10. A roll of wall paper 8 yd. long and 18 in. wide costs $.45. How much will this paper cost for the four walls of a room 40 ft. x 32 ft. and 14 ft. high, no allowance being made for openings?

11. Suppose a man owes you $19.95 and pays it to-day. Write the receipt that you should give him.

LESSON 35. 1. Learn 105 . . . 119.

2. At \$2.25 a thousand, how much will 46850 lath cost?

3. Multiply $\frac{4}{7}$ of $\frac{3}{5}$ of $7\frac{1}{2}$ times $\frac{6}{7}$ of $\frac{2}{3}$ by $\frac{11}{18}$ of 49 times $\frac{2}{11}$ of $\frac{1}{16}$.

4. Divide 100.001 by $\frac{1}{4}$, and express the quotient in three different ways.

5. At \$22 a thousand, find the cost of 48 joists, each 24 ft. long and 9 by 3 inches.

6. A rectangular piece of land containing 4.25 A. is 21.25 rods wide. How long is it?

7. How many cubic inches are there in a board 16 ft long, 13 in. wide, and one inch thick?

8. Add 8 rd. 4 yd. 10 in., 6 rd. 2 ft. 7 in., 12 rd. 3 yd 2 ft. 9 in., and 16 rd. 2 ft. 7 in.

9. A and C can do a piece of work in $7\frac{1}{2}$ days, and A can do it alone in 12 days. In how many days can C do it?

10. Six men agree to expend the same amount in the purchase of land. The first pays \$25 an acre; the second \$27; the third, \$40; the fourth, \$75; the fifth, \$80; and the sixth, \$120. Find the least number of acres that all can buy.

11. Make a bill for 12 articles bought at a drug store to-day and receipt it for the proprietor.

LESSON 36. 1. Learn 120 . . . 129.

2. Express \$958 in English money.

3. Reduce $\frac{3}{8}$, $\frac{49}{56}$, $\frac{5}{11}$, and $\frac{63}{99}$ to 88ths.

4. Divide 18 sq. rd. 15 sq. yd. 7 sq. ft. by $\frac{4}{9}$.

5. Reduce £172 12s. 4d. to United States money.

6. At \$7.50 a ton, how many pounds of straw cost \$45.90?

7. How high must wood be piled, covering one square rod of ground, to make 25 cords 67 cu. ft.?

8. In a mixture of 216 bushels of corn and oats there is $\frac{4}{5}$ as many bushels of oats as corn.

9. If 2 is subtracted from both terms of the fraction $\frac{7}{9}$, how much is the fraction increased or diminished?

10. At $18 per C for the posts and $12.50 per M for the boards, how much will it cost to build a fence four boards high around a rectangular field 64 rods long and half as wide, setting the posts 8 ft. apart and using boards 10 inches wide?

11. How many yards of carpet $\frac{3}{4}$ of a yard wide will be required for a room 19 ft. 8 in. long and 16 ft. wide, if the strips run lengthwise and there is a waste of 6 in. on each strip in matching? How many yards will be required, if the strips run across the room?

LESSON 37. 1. Learn 130 . . . 145.

2. $\dfrac{\frac{11}{12} + 1\frac{3}{4} - \frac{5}{6} + 2\frac{1}{8}}{2\frac{1}{2} + \frac{2}{3} + \frac{7}{8} - 2\frac{3}{4}}$ 3. $\dfrac{(4\frac{4}{5} + 1.95)\frac{2}{9}}{7\frac{2}{3} - (5.2 - 1.1\frac{1}{3})}$.

4. $\frac{13}{18} + \frac{8}{9} - \frac{2}{3} + \frac{19}{24} - \frac{3}{4} + \frac{11}{24} + \frac{7}{8} - \frac{5}{6} + \frac{5}{9} - \frac{11}{18}$.

5. What part of 7 gal. 3 qt. 1 pt. is 3 gal. 2 qt. 1 pt. 2 gi.?

6. Reduce 18 lb. 6 oz. Apothecaries' weight to Avoirdupois weight.

7. If $.3\frac{3}{4}$ of a ton of coal is worth $2.40, how many tons will cost $80?

8. How many cords are there in a pile of wood 28 feet square on the ground and 10 feet high?

9. How many board feet are there in 165 half-inch boards, each 16 feet long and 10 inches wide?

10. Add 28 A. 15 sq. yd. 7 sq. ft. 112 sq. in., 150 sq. rd. 21 sq. yd. 4 sq. ft. 48 sq. in., and 65 A. 75 sq. rd. 6 sq. ft. 62 sq. in.

11. If it requires 255 sq. ft. of zinc to line the bottom and sides of a tank 8 ft. long and 6 ft. 6 in. wide, how deep is it?

12. A has twice as many acres of land as B, and B has 3 times as many acres as C. If all have 2600 acres, how many acres has each?

LESSON 38.

1. Learn 146 . . . 163.

2. From $\frac{4}{5}$ of a bushel subtract 2 pk. 4 qt.

3. Add $\frac{5}{8}$, $.09\frac{1}{3}$, $75\frac{3}{5}$, 9.88, $46\frac{2}{3}$, $.4\frac{3}{4}$, and $79\frac{1}{2}$.

4. Reduce $.0033\frac{1}{3}$, .0875, and $.066\frac{2}{3}$ to common fractions.

5. Find the exact number of days in the first seven months of this year.

6. A is worth 7 times as much as B. If A has $16500 more than B, how much have both?

7. At $.65 a square yard, find the cost of cementing the sides and bottom of a cubical cistern 13 ft. deep.

8. How many half-inch cubes can be cut from a half-inch board 8 ft. long and 10 in. wide?

9. A man paid $386.65 on a debt, which was equal to .44 of what he still owed. Find the amount of the debt.

10. A man has 176 acres in one farm, which is equal to $\frac{4}{9}$ of the number of acres in another. How many acres has he in both farms?

11. A farmer has $\frac{2}{5}$ of his sheep in one field, $\frac{2}{3}$ of the remainder in a second field, and the remainder, which is 45, in a third field. How many sheep has he?

LESSON 39. 1. Learn 164 . . . 172.

2. Reduce $875.45 to English money.

3. Reduce $\frac{2}{3}$, $\frac{1}{5}$, $9\frac{3}{8}$, $\frac{4}{85}$, and $\frac{7}{25000}$ to decimals.

4. Find the distance around a rectangular field 28 rods long and 297 feet wide.

5. A merchant sold silk at $\$\frac{3}{4}$ a yard, receiving $\$85\frac{1}{2}$ for it. How many yards did he sell?

6. The sum of two fractions is $\frac{26}{27}$, and the smaller is $\frac{4}{9}$ of the larger. Find the fractions.

7. There are $6\frac{1}{4}$ acres in a rectangular field. If it is 31.25 rods wide, how long is it?

8. At $17.50 a thousand, find the cost of 275 scantlings, each 14 feet long and 4 by 2 inches.

9. Add 22 sq. yd. 132 sq. in., 8 sq. rd. 28 sq. yd. 4 sq. ft., 27 sq. yd. 7 sq. ft. 120 sq. in., and 64 sq. rd. 18 sq. yd. 3 sq. ft.

10. A bin is 24 ft. square. If the bottom is covered with wheat to the depth of 9 in., how many bushels are there in the bin?

11. If a man should sell a piece of land at $45 an acre, he would gain $2240; but if he should sell it at $35 an acre, he would lose $960. Find the cost of the land.

LESSON 40. 1. Divide $77.29 by $.09\frac{5}{6}$.

2. Multiply 18 rd. 4 yd. 2 ft. 7 in. by $4\frac{3}{4}$.

3. What part of 5 A. 70 sq. rd. is 3 A. 120 sq. rd.?

4. Find the time from July 18, 1890, to Nov. 4, 1894.

5. Find the value of 18450 pounds of iron at $16.75 a ton.

6. A has $875 more than B. If both have $8647, how much has each?

7. At \$27.50 a thousand, how many feet of lumber can be bought for \$265.10?

8. A brick wall contains 1056 cu. ft. If it is 18 in. thick and 16 ft. high, how long is it?

9. A can do a piece of work in $7\frac{1}{2}$ days, and B can do it in 6 days. In how many days can both do it?

10. A box 4 ft. long, 3 ft. wide, and 2 ft. 8. in. deep, inside measures, is made of 2-inch plank. How many cubic inches are there in the lumber of which the box is made?

11. How many yards of carpet will be required for a room 22 ft. 10 in. long and 18 ft. wide, the carpet being 27 in. wide, if the strips run across the room and there is a waste of 1 ft. on each strip in matching?

12. Make a receipted bill for labor performed by yourself. Have not less than 6 items in it.

LESSON 41.

1. Learn 47 . . . 59.

2. $$\frac{(7\frac{4}{5} - 2.05) \div (5 \times .23)}{.7\frac{2}{3} + 2.23\frac{1}{3} - .6 \div .4}.$$

3. $67\frac{2}{3} - (37 - .8\frac{1}{3})$.

4. Divide \$81.50 by $.16\frac{2}{3}$.

5. Reduce 48 lb. 8 oz. Avoirdupois to Apothecaries' weight.

6. At $\$3\frac{4}{5}$ a yard, how much will $46\frac{3}{4}$ yards of velvet cost?

7. At $2\frac{3}{4}$ cents a pound, how much will five barrels of flour cost?

8. A field containing $50\frac{7}{8}$ acres is 18.5 chains wide. How long is it?

9. What number contains each of the prime factors of 44, 52, and 60, but no others?

10. Add 24 rd. 5 yd. 1 ft., 4 yd. 10 in., 86 rd. 3 yd. 2 ft., and 5 yd. 1 ft. 8 in.

11. If a man spent $\frac{2}{3}$ and $\frac{1}{4}$ of his money and has \$12.45 left, how much did he spend?

12. A cistern is 12 ft. square on the bottom and 9 ft. deep. How much water will it hold?

13. At \$28 a thousand, find the cost of 240 boards, each 16 ft. long, 8 in. wide, and $\frac{5}{8}$ in. thick.

14. If 6 is added to both terms of the fraction $\frac{1}{3}$, how much is the fraction increased or diminished?

LESSON 42.

1. Learn 60 . . . 70.

2. Simplify $\frac{(4\frac{1}{2} - 1\frac{3}{4}) \div 5\frac{1}{2}}{4\frac{1}{2} - 2\frac{3}{5}}$.

3. $.723 \div .14$.

4. $.00306 \div .45$.

5. Divide 2 mi. 49 rd. 3 yd. 2 ft. by $4\frac{2}{5}$.

6. Change £420 15 s. 6 d. to United States money.

7. Find the exact number of days from May 23 to Nov. 19 of the same year.

8. At \$$1\frac{3}{5}$ a basket, how many baskets of peaches can be bought for \$352?

9. A bin is 8 feet square. How deep must it be, if it holds 358 bushels?

10. How many 2-inch squares are there in a roll of paper 20 yards long and 4 feet wide?

11. A farmer sold 117 bushels of potatoes, which was equal to .45 of the number of bushels he had left. Find the value of his whole crop at \$.55 a bushel.

12. A man built a tight board fence 32 rods long and 4 ft. 6 in. high. The boards were in an upright position and were nailed to two scantlings 2 by 4 in. The posts were set 8 ft. apart. If he paid \$38 per C for the posts, \$14 per M for the scantlings, and \$18 per M for the boards, how much did the material for the fence cost, no allowance being made for waste of lumber?

LESSON 43. 1. Learn 71 . . . 90.

2. What part of 8 cwt. 75 lb. is 3 cwt. 50 lb.?

3. At $12.75 per M, how much will 2640 brick cost?

4. Divide 125000.0000125 by $\frac{5}{8}$, and express the quotient in three different ways.

5. Add 48 sq. rd. 260 sq. ft., 175 sq. ft. 88 sq. in., and 9 sq. rd. 218 sq. ft.

6. How many cubes $2\frac{1}{2}$ inches long are there in a cube of granite $2\frac{1}{2}$ feet long?

7. A piece of ground containing $\frac{3}{4}$ of an acre is 363 feet long. How wide is it?

8. How many board feet are there in 12 pieces of timber, each 24 ft. long and 13 in. square at the ends?

9. A can do a piece of work in 6 days, B in 8 days, and C in 12 days. In how many days can all do it?

10. Two men bought land for $9000, of which A paid $3600 and B $5400. They sold the land for $12500. How much did each gain?

11. Suppose you keep a store and a man pays you $44.75 on account to-day. Write the receipt that you should give him.

LESSON 44. 1. Learn 91 . . . 104.

2. Reduce $1450 to English money.

3. From $\frac{1}{7}$ of a mile subtract $\frac{8}{9}$ of a rod.

4. Reduce $\frac{2}{3}$, $9\frac{1}{5}$, $\frac{3}{1250}$, $\frac{3}{8}$, and $7\frac{3}{5}$ to decimals.

5. Find the time from Aug. 24, 1872, to Feb. 16, 1892.

6. A man lost $12000 and had $\frac{1}{15}$ of his money left. How much had he left?

7. A cistern is 12 feet square. If it holds 320 barrels of water, how deep is it?

8. A man spent .62 of his salary and had $475 left. How much did he spend?

9. If 7 is subtracted from both terms of the fraction $\frac{12}{17}$, how much is the fraction increased or diminished?

10. A cellar wall measures 28 ft. by 22 ft. on the outside. If it is 6 ft. high and 15 in. thick, how many cubic feet of masonry does it contain?

11. A roll of wall paper 8 yd. long and 18 in. wide costs $.75. How much will this paper cost for the four walls of a room 18 ft. x 14 ft. x 9 ft., allowing 185 square feet for openings?

12. How many yards of carpet one yard wide will be required for a room 24 ft. long and 19 ft. 8 in. wide, if the strips run lengthwise and there is a waste of 10 in. on each strip in matching? How many yards will be required, if the strips run across the room?

LESSON 45.

1. Learn 105 . . . 119.

2. Reduce 42 lb. 6 oz. Troy to Avoirdupois weight.

3. At $$\frac{2}{5}$ a pound, how many pounds of tea can be bought for $$8\frac{4}{5}$?

4. Add 140 rd. 4 yd. 7 in., 64 rd. 2 ft., 3 yd. 11 in., and 180 rd. 1 ft.

5. If $.8\frac{3}{4}$ of a yard of plush is worth $5.95, how many yards are worth $49.30?

6. How much fertilizer will be required for 9 A. 112 sq. rd., allowing 2 bu. 2 pk. 4 qt. to an acre?

7. At $.75 a square yard, it cost $99 to pave a walk. If the walk is 6 ft. wide, how long is it?

8. A shed 14 ft. square and 12 ft. high is filled with wood. Find the value of it at $3.75 a cord.

9. At $32 a thousand, find the cost of 425 pine boards, each 14 ft. long, 12 in. wide, and $1\frac{1}{4}$ in. thick.

10. A lady paid $70.74 for a hat and dress, paying $4\frac{2}{5}$ times as much for the dress as she paid for the hat.

11. Bought four equal loads of coal at $5.50 a ton, paying $25.41 for it. How many pounds were there in each load?

12. Make a bill for 8 articles bought at a grocery store to-day and receipt it for the proprietor.

LESSON 46. 1. Learn 120 . . . 129.

2. Change $\frac{5}{9}$, $\frac{28}{63}$, $\frac{5}{12}$, $\frac{132}{144}$, and $\frac{7}{12}$ to 108ths.

3. Add $\frac{7}{8}$, $\frac{2}{3}$, $\frac{4}{5}$, 9.647, $8.93\frac{1}{3}$, $59.7\frac{3}{4}$, and $4.07\frac{3}{5}$.

4. Multiply 28 sq. rd. 26 sq. yd. 7 sq. ft. 84 sq. in. by $7\frac{2}{5}$.

5. Find the exact number of days from Aug. 24, 1891, to May 13 of the next year.

6. If a man can mow 5 acres of grass in .8 of a day, how many acres can he mow in 4.2 days?

7. There are 27 cords in a pile of wood. If the pile is 8 ft. square at the ends, how long is it?

8. A man owning .68 of an acre of land, sold .25 of what he owned. What part of an acre had he left?

9. A man built a house costing five times as much as the lot. If the lot cost $14000 less than the house, how much did both cost?

10. Find the cost of plastering a room 26 ft. long, 18 ft. wide, and 14 ft. high, at $.55 a square yard, deducting $\frac{1}{20}$ of the side walls for doors and windows.

11. Paid $\frac{2}{5}$ of my money for a watch and $\frac{1}{4}$ of the remainder for a chain. If the watch cost $75 more than the chain, how much money had I left?

LESSON 47.

1. Learn 130 . . . 145.

2. $$\frac{\frac{2}{3}+\frac{3}{8}-\frac{1}{6}}{\frac{1}{1\frac{1}{3}}+\frac{1}{2\frac{2}{5}}+\frac{1}{1\frac{1}{2}}}.$$

3. $$\frac{8.3\frac{2}{3}-(4\frac{1}{3}-1.1\frac{2}{3})}{9.3-12\frac{1}{4}\div 4.375}.$$

4. If the capacity of a bin is 14 cu. yd., how many bushels will it hold ?

5. A rectangular field containing 7¼ A. is 7.5 chains wide. How long is it?

6. A man sold nine loads of hay, each load weighing 2245 pounds, at $14.50 a ton.

7. Add 18 sq. yd. 7 sq. ft. 123 sq. in., 8 sq. ft. 140 sq. in., and 16 sq. yd. 116 sq. in.

8. How many board feet are there in 75 joists, each 20 ft. long and 10 by 3 in. ?

9. If .45 of a pile of wood is worth $115.65, how much are three such piles worth ?

10. A and C can do a piece of work in 12 days, and A can do it alone in 20 days. In how many days can C do it ?

11. A square field is 68½ rods on each side. How much will it cost to inclose it with a fence at $2.25 a rod ?

12. A man spent ⅓ of his money for a horse, ⅗ of it for a carriage, and had $224 left. How much did the horse and carriage cost?

LESSON 48.

1. Learn 146 . . . 163.

2. Divide 5 A. 75 sq. rd. 26 sq. yd. 7 sq. ft. by 3$\frac{5}{7}$.

3. What cost 46250 ft. of pine lumber at $28.40 per M ?

4. Paid $4.80 for envelopes at $6.40 per M. How many did I buy ?

5. Find the exact number of days from Sept. 18, 1891, to July 14, 1892.

6. The difference between $\frac{6}{7}$ of a number and $\frac{1}{2}$ of the same number is 265. Find the number.

7. A bin holds 900 bushels of corn. If it is 14 ft. long and 10 ft. wide, how deep is it?

8. A farmer has 1842 bushels of wheat and corn. If he has 484 bushels more of wheat than of corn, how many bushels has he of each?

9. A and B can do a piece of work in 8 days, A and C in 7 days, and A alone in 12 days. In how many days can B and C do it?

10. How many yards of carpet $\frac{3}{4}$ of a yard wide will be required for a room 20 ft. long and 17 ft. wide, if the strips run across the room and there is a waste of 1 ft. on each strip in matching? How many yards will be required, if the strips run lengthwise?

LESSON 49. 1. Divide \$123.25 by .20$\frac{5}{7}$.

2. Add $\frac{5}{7}$ A., $\frac{2}{3}$ sq. rd., $\frac{8}{9}$ sq. yd., and $\frac{3}{4}$ sq. ft.

3. What part of 8 lb. 10 oz. 18 pwt. is 5 lb. 8 oz. 14 pwt.?

4. Find the number of ounces Troy weight in 18 lb. 8 oz. Avoirdupois weight.

5. A cubical cistern is 12 feet deep. How many bushels of wheat will it hold?

6. What is the value of a car-load of coal, weighing 42650 pounds, at \$5.20 a ton?

7. At \$28 a thousand feet, find the cost of 750 boards, each 14 ft. long, 12 in. wide, and one inch thick.

8. If 8 is added to both terms of the fraction $\frac{1}{2}$, how much is the fraction increased or diminished?

9. A man lost $\frac{2}{5}$ of his money and then gained $\frac{5}{9}$ as much as he had left, when he had $35000. How much had he at first?

10. If it requires 132 sq. ft. of zinc to line the bottom and sides of a tank 6 ft. long and 4 ft. 6 in. wide, how deep is it?

11. A dealer bought 420 barrels of flour at $4.75 a barrel. He sold 80 barrels at a loss of $.20 a barrel. At what price must he sell the rest to have a net gain of $111.50?

12. Make a bill for ten articles bought at a dry goods store at different times and receipt it as the proprietor.

LESSON 50. 1. Learn 164 . . . 172.

2. A cistern 8 feet square has 120 barrels of water in it. How deep is the water?

3. At $450 an acre, find the cost of a rectangular piece of land 8 ch. 60 l. long and 5 ch. 30 l. wide.

4. Find the number of board feet in 465 joists, each 24 ft. long, 10 in. wide, and 3 in. thick.

5. At $175 an acre, a rectangular piece of land 2 chains wide cost $1190. Find the length of it in chains and links.

6. There are 946 pupils in a school. If $\frac{2}{3}$ of the number of girls is equal to $\frac{4}{5}$ of the number of boys, how many are there of each?

7. A boy bought peaches, paying 2 cents for 4, and sold them at the rate of 3 for 5 cents, thereby gaining $2.17. How many did he buy?

8. The inside measurements of a cellar wall are 36 ft., 28 ft., and 8 ft. If the wall is 2 ft. thick, how many cubic yards of masonry are there in it?

9. A man bought a house and a farm, paying $2\frac{2}{3}$ times as much for the farm as he paid for the house. If the farm cost $3750 more than the house, how much did both cost?

10. If a merchant should sell a piece of silk at $2.85 a yard, he would gain $48.40; but if he should sell it at $2.35 a yard, he would gain only $26.40. How much would he receive for it at the less price?

SEVENTH GRADE — FIRST TERM.

To the Teacher. — Before assigning this lesson, teach 173 . . . 179. Drill also in expressing different rates decimally and with the symbol. Lead pupils to see that there are two more decimal places in the rate when expressed decimally than when expressed with the symbol.

LESSON 1. 1. Learn 173 . . . 179.

2. Express 2%, 14%, 5½%, ½%, 100%, 4⅓%, ⅓%, ⅛%, .7%, and ¼% decimally.

3. Express .04, .005, .0525, .00⅓, .12, .003, 1, .07⅓, .00125, and .0275 with the symbol.

4. What is 17% of 8600 bushels? 12½% of 9600 sheep? 123% of 14200? ½% of 200? 5⅓% of $729?

5. A farmer raised 1024 bushels of grain, 25% of which was oats and the remainder wheat.

6. What is 8% of $1275? ¾% of $125? 100½% of 7400? 16⅔% of 4 sq. ft.? 14⅔% of 7500 men?

7. I had $8600 in the bank. I drew out 7½% of it at one time and 50% of the remainder at another time.

8. Find 16¼% of 820 miles. 120% of $1460. 25% of 18824 pounds. ⅘% of $93.75. 20⅔% of 2463.

9. Study the following carefully:

50 % = ½.
33⅓% = ⅓.
66⅔% = ⅔.
25 % = ¼.
75 % = ¾.
20 % = ⅕.
40 % = ⅖.
60 % = ⅗.
80 % = ⅘.
16⅔% = ⅙.
83⅓% = ⅚.
12½% = ⅛.
37½% = ⅜.
62½% = ⅝.
87½% = ⅞.

$10\% = \frac{1}{10}$. $\frac{1}{5}\% = .002$. $\frac{1}{8}\% = .00125$.
$\frac{1}{2}\% = .005$. $\frac{2}{5}\% = .004$. $\frac{3}{8}\% = .00375$.
$\frac{1}{4}\% = .0025$. $\frac{3}{5}\% = .006$. $\frac{5}{8}\% = .00625$.
$\frac{3}{4}\% = .0075$. $\frac{4}{5}\% = .008$. $\frac{7}{8}\% = .00875$.

LESSON 2. 1. Learn 173 . . . 179.

2. Express $3\frac{1}{4}\%$, 9%, 5.2%, 18%, 300%, $\frac{1}{4}\%$, $15\frac{2}{3}\%$, $\frac{3}{8}\%$, and $\frac{4}{5}\%$ decimally.

3. Express .085, .006, .05, $.00\frac{1}{7}$, .18, $.09\frac{1}{9}$, 4, .00125, .0125, and 2.26 with the symbol.

4. A man had $250000 to invest. He invested 16% of it in railroad bonds, 45% of it in government bonds, and the remainder in real estate.

5. I bought a house for $7500 and sold it for 24% more than I paid for it.

6. There are 540 pupils in a school, 45% of whom are boys. How many girls are there ?

7. A man invested $12600 in business. He lost $33\frac{1}{3}\%$ of it the first year and 12% of the remainder the second year.

8. A man bequeathed his property, valued at $200000, as follows: 35% to his wife, and the remainder equally to his four sons.

9. A farmer raised 2500 bushels of wheat. He sold 28% of it at 90 cents a bushel, 40% of the remainder at 85 cents, and the remainder at 95 cents.

10. A bookkeeper earns $1800 a year. He spends 15% of it for clothes, 22% for board, 8% for other expenses, and saves the remainder.

11. Study 9 in Lesson 1.

LESSON 3.

1. Express $\frac{1}{8}$%, 24%, 200%, 8$\frac{1}{9}$%, 7%, $\frac{2}{3}$%, 6$\frac{5}{8}$%, .1%, $\frac{3}{5}$%, and .04% decimally.

2. Express .24, .1675, .00$\frac{1}{9}$; 10, .07, .0025, .007, .055, .00375, .0175, and .05$\frac{1}{7}$ with the symbol.

3. A man bought a section of land at $45 an acre, which pays him an annual income of 25% on his investment.

4. A man worked 24% of 150 days at $3 a day. He saved $78, paid $15 for board, and bought a suit of clothes with the rest of his money.

5. A dealer bought 1800 tons of coal at $3.75 a ton. He sold 16$\frac{2}{3}$% of it at $4.25 a ton, 40% of it at $4.45 a ton, and the remainder at $4.60 a ton.

6. A merchant bought 125 gallons of molasses at 40 cents a gallon. 8% of it leaked out, and he sold the remainder at 60 cents a gallon.

7. My salary last year was $800, but this year it is 15% less. How much is it this year?

8. A man bought 250 dozen oranges for $60. He lost 12$\frac{1}{2}$% of them and sold the remainder at 4 cents apiece.

9. What is the value of 35% of 28000 pounds of wool at 25$\frac{1}{2}$ cents a pound?

10. A man bought a piece of land for $2400 and sold it for 233$\frac{1}{3}$% of the cost.

To the Teacher. — Teach 180.

LESSON 4.

1. Learn 173 . . . 180.

2. Express .6%, $\frac{3}{4}$%, 10$\frac{3}{8}$%, 16%, 1000%, $\frac{3}{10}$%, 5%, 28$\frac{1}{3}$%, 4.5%, and $\frac{7}{8}$% decimally.

3. Express .07125, .00$\frac{2}{3}$, .35, .0075, 3, .08$\frac{2}{3}$, .09, .004, .00625, and .008 with the symbol.

4. What per cent of 875 is 210? Is 477 of 450? Of 18000 is 45? Of \$1500 is \$110? Is 18404 of 8600?

5. A man having 340 sheep sold 119 of them. What per cent of his flock had he left?

6. What per cent of 5850 is 429? Is 3900? Is 5265? Is 5967? Is 767?

7. A man left his property, valued at \$80000, as follows: 40% to his wife, 50% of the remainder to his daughter, and the remainder equally to his two sons.

8. What per cent of 20 miles is 1056 rods? Of \$10200 is \$12.75? Is 300 of 1600? Of 780 is 1014? Is 658 sheep of 940 sheep?

9. Study 9 in Lesson 1.

LESSON 5. 1. Learn 173 . . . 180.

2. Express 8%, 600%, $6\frac{2}{3}$%, $\frac{1}{4}$%, $\frac{1}{10}$%, 13%, 125%, $\frac{3}{8}$%, $4\frac{3}{4}$%, and $\frac{1}{2}$% decimally.

3. Express .04875, .06, $.00\frac{4}{7}$, .008, 7, .0625, $.12\frac{1}{8}$, .12125, .045, .002, and .146 with the symbol.

4. I bought a house for \$7250 and paid \$3190 on it. What per cent of the cost remains unpaid?

5. There are 750 trees in an orchard, 8% of which are cherry-trees, 30% pear-trees, and the remainder apple-trees.

6. What per cent of \$500 is \$18.75? Of 65 gal. is 9 gal. 3 qt.? Of \$480 is \$20.16? Is \$1137.50 of \$875? Of 2225 is 89?

7. A man invested \$25000, from which he receives an annual income of \$7500. What per cent of the investment is his income?

8. From a cask containing 35 gal. of wine, all but 4 gal. 3 qt. was sold. What per cent of the wine remained in the cask?

9. A farmer raised 1150 bushels of potatoes and sold 253 bushels. What per cent of his crop had he left?

10. I bought a section of land at $15 an acre and sold it for 150% of the cost. Find the gain.

11. A piece of ground is 48 rods long and 42 rods wide. What per cent of each dimension is the other?

LESSON 6.

1. Express 8%, $\frac{1}{5}\%$, 200%, $4\frac{1}{3}\%$, $\frac{1}{4}\%$, $3\frac{3}{8}\%$, $\frac{1}{2}\%$, $2\frac{7}{8}\%$, and 42% decimally

2. Express .0075, .05, .04125, .005, 4, .004, $.00\frac{2}{3}$, .008, .1725, and .00625 with the symbol.

3. A farmer sold 759 bushels of wheat and had 891 bushels left. What per cent of his crop had he left?

4. In a school there are 153 boys and 272 girls. What per cent of the whole number is each?

5. A speculator bought 800 barrels of apples for $1200. He lost 5% of them and sold the remainder for $92 more than they cost.

6. A man bought two horses for $875, paying $490 for the better one. What per cent of the entire cost was the cost of each?

7. I have paid $1139 on a debt and still owe $402 more than I paid. What per cent of the debt do I still owe?

8. A man bought five sections of land at $8 an acre. He sold 25% of it at $12 an acre, $33\frac{1}{3}\%$ of the remainder at $15 an acre, and the remainder at $20 an acre.

9. A farmer raised 252 bushels of wheat from 27 bushels of seed. What per cent of the seed was the increase?

TO THE TEACHER. — Teach 181.

LESSON 7. 1. Learn 173 . . . 181.

2. Express .4%, $1\frac{1}{4}\%$, 6%, $\frac{4}{5}\%$, 7.3%, 400%, $\frac{3}{5}\%$, $\frac{1}{4}\%$, $\frac{1}{8}\%$, and $17\frac{3}{7}\%$ decimally.

3. Express .055, .002, .00$\frac{1}{3}$, 6, .00375, .0075, .008, .007, .00875, and .006 with the symbol.

4. Find the number of which 310 is 8%. Of which 302 is $\frac{1}{4}\%$. Of which $143.20 is 16%. Of which 4536 is 108%. Of which $91.30 is $7\frac{1}{3}\%$.

5. 22750 is 13% of what number? 7%? $\frac{1}{4}\%$? 70%? 25%? 130%? $2\frac{1}{2}\%$?

6. Find the number of which 1378 is $17\frac{2}{3}\%$. 8 % of 18900 is 15% of what number? 1111 is $13\frac{3}{4}\%$ of what number? $\frac{4}{5}\%$ of 4000 is $\frac{1}{4}\%$ of what number?

7. A man bought property for $75000, for which he receives a monthly rental of $925. What per cent of the investment is the yearly income?

8. A boy spent $1.76, which was $7\frac{1}{3}\%$ of his money. How much money had he left?

9. Study 9 in Lesson 1.

LESSON 8.

1. Express $\frac{3}{8}\%$, 28%, 200%, $4\frac{1}{7}\%$, $\frac{1}{5}\%$, $4\frac{4}{5}\%$, $1\frac{1}{8}\%$, $125\frac{1}{4}\%$, and $\frac{3}{4}\%$ decimally.

2. Express .0075, .042, .3, .006, .00$\frac{3}{7}$, .018, .00875, .044, 2.2, and .05625 with the symbol.

3. I drew out of the bank $344.47, which was equal to 14% of the sum I had left in the bank. How much had I in the bank at first?

4. The number of boys in a school is 255, which is 34% of the whole number of pupils.

5. A man sold 104 sheep and had 221 left. What per cent of his flock did he sell?

6. A man discharged 43⅕% of a debt by paying $1080. How much did he still owe?

7. I sold 891 pounds of wool, which was equal to 44% of what I had left. How much had I at first?

8. A lady spent 38% of her money for a dress that cost $108.30. How much money had she left?

9. A man bought two carriages for $400, paying $275 for the better one. What per cent of the entire cost was the cost of each?

10. Study 9 in Lesson 1.

LESSON 9.

1. Express ⅗%, 10⅜%, ¾%, 400%, 1.38%, 7⅓%, ¼%, 17⅞%, and ⅛% decimally.

2. Express .04125, .00⅓, .01375, .072, .008, .0275, .006, 2.7, .0025, and .10625 with the symbol.

3. A man sold 216 sheep and had 55% of his flock left. How many sheep had he left?

4. I added $441.66 to my deposit in the bank and increased my money in the bank 24%.

5. A received 48% of his father's estate and B 36% of it, A receiving $19200 more than B. How much did each receive?

6. If six gallons of water are added to 39 gallons of wine, what per cent of the mixture is each?

7. A man worth $150000 gave 24% of his property to his son, and this was equal to 90% of what the son already had. How much did he then have?

8. I drew out 40% of my deposit in the bank. Of that sum, I have spent $730, which is 29⅕% of what I drew out.

9. I paid a man $220.32 and still owe him $375.36 more than I paid. What per cent of the debt do I owe?

10. A merchant pays $1800 a year rent for his store. 40% of this sum is 36% of one-third his profits.

To the Teacher. — Teach 182.

LESSON 10.

1. Learn 173 . . . 182.

2. Express 7¼%, 700%, 4⅔%, ⅖%, ⅒%, 4½%, ⅛%, 1¾%, ⅘%, and 1⅞% decimally.

3. Express .00375, .075, .028, .006, 3, 1.5, .0425, .0875, .00625, and .104 with the symbol.

4. What number increased by 8% of itself equals 1377? By 17½%, equals 2350? By 130%, equals 1955? By ⅜%, equals 1606? By .7%, equals 8056?

5. The number of trees in an orchard has been increased 16%, and now there are 522. How many were added?

6. What number increased by 200% of itself equals 4500? By 9⅔%, equals 1974? By ¼%, equals 914.28? By 14%, equals 7739.46? By 40%, equals 595.7?

7. A man bought a carriage for $225. ⅕ of the cost of the carriage was equal to 9% of the cost of a span of horses. Find the cost of both.

8. What number increased by ⅝% of itself equals 9982? By 170%, equals 24192? By 6⅔%, equals 3686.4? By 19%, equals 4767.14? By .4%, equals 6526?

LESSON 11.

1. Express 4.2%, 10⅜%, ¾%, 200%, ¼%, 2½%, ⅘%, 8⅕%, ⅞%, and .25% decimally.

2. Express .005, 2, .004, .04375, .0175, 1.2, .0025, .006, 17, .088, and .04625 with the symbol.

3. A owns 837 acres of land, which is 24% more than B owns. How many acres have both?

4. The population of a city has increased 124%, and now it is 18200. How much has it increased?

5. A widow received $57\frac{1}{7}\%$ of her husband's estate and her daughter $42\frac{6}{7}\%$ of it, the widow receiving $20000 more than the daughter. Find the daughter's share.

6. I sold a piece of land for $5500, which was 120% more than I paid for it. How much did I gain?

7. After a man's salary had been increased 15%, he received $4600. How much was it increased?

8. A man owes $4125, which is 32% more than he is worth. How much is he worth?

9. A clerk spent $1347 and had $43\frac{7}{8}\%$ of his salary left. How much did he save?

10. Study 9 in lesson 1.

LESSON 12.

1. Express $4\frac{3}{4}\%$, $\frac{3}{5}\%$, 400%, $\frac{1}{8}\%$, $10\frac{3}{8}\%$, $\frac{4}{5}\%$, $7\frac{1}{3}\%$, 4.4%, $\frac{7}{8}\%$, and $\frac{1}{4}\%$ decimally.

2. Express .00625, .005, .0725, .00125, 2.4, .006, .024, .008, .75, and .242 with the symbol.

3. I sold a horse and carriage for 40% more than they cost and received $560 for them. Find the gain.

4. My income this year is $4096, which is 28% more than it was last year. How much was it last year?

5. A man worth $50000 gave 9% of it to his wife, and this was equal to 60% of what she already had.

6. A man has $301 in a bank, and this is 72% more than he has in his safe. How much money has he?

7. I spent $2260 in repairs on my house, which is 13% more than one-third the cost. Find the cost.

8. I deposited in a bank a sum equal to 16% of what I already had on deposit, when my money in the bank amounted to $522. How much did I deposit?

9. A farmer sold 208 bushels of corn, which was equal to 65% of the number of bushels he had left.

10. A merchant fails, with liabilities amounting to $19885, which is 64% more than his assets. How many cents can he pay on a dollar?

To the Teacher. — Teach 183.

LESSON 13. 1. Learn 173 . . . 183.

2. Express $\frac{1}{5}\%$, $4\frac{2}{3}\%$, $5\frac{1}{8}\%$, 150%, $\frac{2}{5}\%$, $\frac{1}{10}\%$, $\frac{3}{7}\%$, 4.2%, and $\frac{3}{4}\%$ decimally.

3. Express .0025, .07125, 4.8, .065, .02375, .006, .0075, .005, .01625, and .00875 with the symbol.

4. What number diminished by 14% of itself equals 2924? By $7\frac{2}{3}\%$, equals 1662? By $\frac{1}{4}\%$, equals 2429.91? By 93%, equals 546? By .3%, equals 1395.8?

5. I drew out 44% of my money in the bank and had $27.02 remaining in the bank. Find the sum drawn out.

6. What number diminished by 18% of itself equals 3567? By $13\frac{1}{3}\%$, equals 8840? By $\frac{5}{8}\%$, equals 954? By 2%, equals 833? By .8%, equals 5084?

7. A man sold a farm for $11\frac{1}{9}\%$ more than he paid for it and received $5000 for it. Find the gain.

8. What number diminished by $\frac{1}{2}\%$ of itself equals 23880? By $8\frac{1}{5}\%$, equals 20196? By 30%, equals 3360?

9. Study 9 in lesson 1.

LESSON 14.

1. Express 2.8%, $\frac{3}{4}\%$, $7\frac{1}{8}\%$, $\frac{1}{2}\%$, $\frac{3}{5}\%$, 160%, $5\frac{3}{8}\%$, $72\frac{7}{8}\%$, and $\frac{1}{4}\%$ decimally.

2. Express .42375, 2.7, .005, .08125, .9, .0075, .4, .00875, .01375, and .904 with the symbol.

3. A farmer lost 32% of his wheat by fire and had 1649 bushels left. How many bushels did he lose?

4. I sold a piece of land for $1240, which was 17⅓% less than I paid for it. Find the loss.

5. A merchant's profits this year are $4565.70, which is 14% more than his profits last year.

6. After a man's salary had been reduced 8%, he received $1150. How much was it reduced?

7. A man sold a house for 6¼% less than it cost and received $6000 for it. How much did he lose?

8. A man spent $2400 in improvements on his farm, which was 40% less than one-third the first cost.

9. After my salary had been increased 30%, I received $1560. How much was it increased?

10. Study 9 in lesson 1.

LESSON 15.

1. Express 4½%, ⅘%, 12⅛%, 200%, ⅕%, 4¾%, ⅞%, 10⅜%, and 170% decimally.

2. Express 1.2, .004, .00125, .0425, .12625, .00375, .008, 1.34, and .005 with the symbol.

3. A has 357 sheep, which is 16% less than the number B has. How many have both?

4. A merchant's profits last year were $3720. This year they are 4% less.

5. A fails, with liabilities amounting to $81000, which is 80% more than his assets. How many cents can he pay on a dollar?

6. Having lost 16% of my money in speculation, I have $14133 left. How much did I lose?

7. The number of trees in an orchard has been diminished 9⅓%, and now there are 680 trees.

8. I paid $252 for a carriage, which was 28% less than I paid for a horse. Find the cost of both.

9. I deposited in a bank a sum equal to 60% of what I already had in the bank, when my deposit amounted to $728. Find the amount of the last deposit.

10. After a man had spent 64% of his money, he had $252 left. How much did he spend?

LESSON 16.

1. Learn 173 . . . 183.

2. What is 12% of $875? 56% of $475? 7½% of 840 bushels? 18⅓% of 960 sheep? ¾% of $25000?

3. What per cent of 840 is 126? Of $1860 is $651? Of 3850 is 308? Of $560 is $35? Is $25.20 of $180?

4. What number increased by 15% of itself equals 989? By 8%, equals 2025? By 7½%, equals 511.7? By 32%, equals 5379? By .8%, equals 5166?

5. Find the number of which 315 is 7%. Of which 450 is 24%. Of which 30.42 is 6½%. Of which 550.2 is 70%.

6. What number diminished by 12% of itself equals 154? By 6%, equals 1598? By 17½%, equals 732.6? By 93%, equals 339.5? By .7%, equals 47664?

7. Find 37½% of 1952. ¼% of $96. 17% of 4800 bushels. 3⅓% of $1656. 7⅕% of 125 miles. 104½% of $780.

LESSON 17.

1. What per cent of 4850 is 4171? Is $4064 of $3175? Of 16800 is 42? Of a square mile is 12800 square rods?

2. What number increased 45% of itself equals 108750? By ¾%, equals 36.27? By 112%, equals 1537? By 3⅛%, equals 1732.5? By .25%, equals 7218?

3. 162 is 8% of what number? $\frac{1}{4}$%? 9%? 30%?

4. What number diminished by 2% of itself equals 931? By $\frac{1}{4}$%, equals 7980? By $5\frac{1}{3}$%, equals 1136? By $24\frac{1}{8}$%, equals 3642? By .2 %, equals 598.8?

5. A man had his salary reduced $21\frac{1}{2}$%. His former salary was $1600.

6. What per cent of 18400 is 138? Of 160 bushels is 172 bushels? Is $288 of $1280? Of $3400 is $4.25? Is $235.50 of $785? Of 4800 is 36?

To the Teacher. — Give frequent drill during the remainder of the term on the oral exercises following this term's work.

LESSON 18.

1. What number increased by 24% of itself equals 651? By $6\frac{1}{3}$%, equals 175.45? By 222%, equals 3059? By $\frac{5}{8}$%, equals 9499? By .2%, equals 601.2?

2. Of what number is 67 bushels 4%? Of what number is 957.7 122%? 304 is 64% of what number? 1728 is 135% of what number?

3. What number diminished by $6\frac{2}{3}$% of itself equals 1750? By 30%, equals 686? By $15\frac{1}{2}$%, equals 3268.46? By $14\frac{2}{7}$%, equals 1254? By .6%, equals 9443?

4. What is 172% of $1285? $\frac{3}{8}$% of $160? $4\frac{1}{3}$% of 4200? $100\frac{7}{8}$% of $448? $7\frac{1}{2}$% of .024?

5. A man having 175 sheep sold 112. What per cent of his flock did he sell?

6. A flock of sheep has been increased by 35% of its original number and now contains 324.

7. The number of children in a town is 1104, which is 23% of the whole population.

8. John earns $15.40 a week, which is 45% less than his father earns. How much do both earn?

LESSON 19.

1. A farmer raised 2400 bushels of grain, $58\frac{1}{2}\%$ of which was wheat and the remainder oats.

2. What per cent of 160 sheep are 368 sheep? Is $59.50 of $85? Of $2560 is $16? Of 480 is 624? Is $130.50 of $145? Of 7200 is 18?

3. What number increased by $9\frac{2}{3}\%$ of itself equals 861.98? By .7%, equals 68476? By 162%, equals 3275? By 1000%, equals 4818? By .9%, equals 95.855?

4. Find the number of which 1821 is $\frac{3}{8}\%$. Of which 12470 is 145%. Of which 3640 is $43\frac{1}{3}\%$.

5. What is $30\frac{1}{4}\%$ of $560? $37\frac{1}{2}\%$ of $\frac{4}{5}$? $40\frac{2}{3}\%$ of $12600? 60% of $\frac{5}{9}$? $130\frac{1}{2}\%$ of $950?

6. A man bought a house for $8750 and paid $2625 on it. What per cent of the cost remained unpaid?

7. After a man's salary had been increased 18%, he received $1475.

8. A man sold 119 sheep and had 66% of his flock left. How many had he left?

9. What number diminished by 85% of itself equals 518.4? By $30\frac{2}{3}\%$, equals 5304? By $\frac{4}{7}\%$, equals 14616? By $40\frac{4}{9}\%$, equals 162140?

LESSON 20.

1. A grocer bought 1275 gallons of molasses and lost 8% of it by leakage. He sold the remainder at 55 cents a gallon.

2. A man sold a farm for $8835, which was 14% more than he paid for it. Find the gain.

3. A man invested $16500 in a manufacturing business, from which he receives an annual income of $2200. What per cent of the investment is the income?

4. The number of trees in an orchard has been diminished 16%, and now there are 567 trees.

5. A dealer bought 3400 tons of coal at $4.15 a ton. He sold 25% of it at $4.35 a ton, 45% of it at $4.55 a ton, and the remainder at $4.80 a ton.

6. A man drew out of a bank $103.20, which was equal to 14⅓% of the sum he had remaining in the bank.

7. A farmer sold 897 bushels of potatoes and had 78 bushels left. What per cent of his crop had he left?

8. A merchant sold goods for 12⅔% more than they cost and received $212.94 for them.

9. A clerk spent $456 and had 62% of his salary left. How much did he save?

10. I reduced my deposit in the bank 17⅓% and had $12400 remaining in the bank.

LESSON 21.

1. A man worth $75000 bequeathed 44% of it to his wife and the remainder equally to his two sons.

2. A man spent $629 for board and clothes, which was 34% of his salary. How much did he save?

3. A farmer raised 4350 bushels of wheat and sold 1392 bushels. What per cent of his crop had he left?

4. A has 242 sheep, which is 45% less than the number owned by B. How many have both?

5. A salesman earns $1800 a year. He spends 14% of it for board, 22% for clothes, 19% for other necessary expenses, and saves the remainder.

6. From a cask containing 70 gallons of molasses, 10 gallons 2 quarts leaked out. What per cent of the whole remained in the cask?

7. The population of a city has increased 170% in five years, and now it is 60750. Find the increase.

8. A man discharged 19½% of a debt by paying $30.42. How much did he then owe?

9. A man sold a carriage for $252, which was 28% less than he paid for it.

LESSON 22.

1. A man worked 37½% of 24 days at $2.15 a day and received in payment a coat worth $15 and a pair of shoes.

2. A owns 364 acres of land, which is 30% more than the number of acres owned by B.

3. A rectangular piece of ground is 78 rods long and 60 rods wide. What per cent of each dimension is the other?

4. I sold land for 18⅔% less than it cost and received $1342 for it.

5. A farmer sold 459 bushels of potatoes, which was equal to 54% of what he had left.

6. A man bought a section of land at $28 an acre, which pays him an annual income of 15¾% on the investment.

7. A speculator bought land for $12875 and paid $5665 on it at the time of purchase. What per cent of the cost remained unpaid?

8. My income last year was $2249, which was 15⅓% more than it was the preceding year.

9. By adding $141.34 to my deposit in the bank, I increased my deposit 18½%.

10. After a clerk's salary had been reduced 12%, he received $1540.

LESSON 23.

1. A man had $75000 to invest. He invested 24% of it in bank stock, 66⅔% of the remainder in U.S. bonds, and the remainder in real estate.

2. A merchant fails, with liabilities amounting to $24300, which is 44% more than his assets.

3. After paying $130.69 on a debt, a man still owes $205.37 more than he paid. What per cent of the debt did he pay?

4. A man expended $1260 in repairs on his house, which was 72% less than the first cost of the house.

5. A lady paid 24% of her money for a dress that cost $66. How much money had she left?

6. A capitalist paid $42500 for real estate, on which he receives an annual rental of $6035. What per cent of the investment is the income?

7. A earns $93 a month, which is 24% more than B earns. How much do both earn?

8. A farmer sold 387 bushels of potatoes and had 55% of his crop left. How many bushels had he left?

9. A man lost 9% of his sheep and had 1092 left. How many did he lose?

To the Teacher. — Teach 184.

LESSON 24.

1. Learn 173 . . . 184.

2. A stationer bought books for $186 and sold them at a gain of 35%.

3. A man sold a carriage for $147, which was $33 less than he paid for it.

4. A merchant sold flour at 71½ cents a barrel above cost and gained 16¼%.

5. I sold property that cost me $12500 at a loss of $775. Find the loss per cent.

6. A merchant loses 6⅔% by selling rubbers at 70 cents a pair. How much did they cost?

7. A man bought a span of horses for $350 and sold them for $550.

8. I lost 24% on some damaged goods that cost $875.

9. Sold a carriage at a loss of $27.60, which was 23% of the cost.

10. A merchant sold a bill of goods for $276 and gained $36.

LESSON 25.

1. Learn 173 . . . 184.

2. I gained $1160 on some property that cost $16000.

3. A sold his farm for $8850, which was 18% more than he paid for it.

4. A man bought a house for $4440 and after expending $360 for repairs, sold it for the first cost.

5. Goods that cost $7500 were sold at an average profit of 12%.

6. A man sold his household furniture for $1196 and lost $184.

7. By selling a house for $975 more than it cost, I gained 15%.

8. Bought a farm for $8400 and sold it at a loss of $784.

9. There is a loss of 8% on goods sold for 46 cents a yard. Find the cost.

10. A grocer sells flour at $5 a barrel. It cost $4.40.

LESSON 26.

1. Bought gloves at $15 a dozen pair and marked each pair to be sold at 12% below cost.

2. A builder received $1265 less for a hotel than it cost him, thereby losing 5%.

3. By selling a house for $5000, I gained $500.

4. Bought a store for $7500 and sold it at a profit of $840.

5. A grocer bought tea that he could sell for 68 cents a pound and make a profit of 60%.

6. I paid $5120 for a section of land and sold it at an advance of 12½%.

7. Sold a stock of goods for $13899 and lost $2501.

8. A merchant sold goods for 113½% of their cost, or $49.14 more than he paid for them.

9. A man sold a horse for $230 and lost 8%.

LESSON 27.

1. Silk that cost $1.60 a yard was sold for $1.90.

2. A merchant is obliged to sell some goods that cost $1825 at a loss of 14%.

3. A man lost $21.25 by selling an acre of land for 91½% of the cost.

4. A grocer sold tea at 80 cents a pound, which was 15 cents more than it cost.

5. A sold a stock of goods that cost $5400 at an advance of $342.

6. I gained 18¾% on shoes for which I received $4.75 a pair.

7. A grocer bought 200 barrels of flour for $900. The flour being damaged, he was obliged to sell it for $3.50 a barrel.

8. A merchant sold dry goods that cost $1600 at a profit of 18%, and groceries that cost $1200 at a loss of 14⅔%.

9. By selling a farm for $6786, I lost $1014.

LESSON 28.

1. Learn 173 . . . 184.

2. A sold his house for 128% of the cost and gained $728. How much did it cost?

3. B sold a horse and carriage that cost $350 at a loss of $56.

4. A merchant, wishing to sell his entire stock of goods, offered them for $8800, which was 8⅓% below cost.

5. A stationer bought paper at $2.40 a ream and sold it at 20 cents a quire.

6. A sold a house to B for $4500, and B sold it to C at a loss of 24%.

7. A man sold a horse for $38.50 below cost and lost 14%. How much did he receive for the horse?

8. A grocer made a profit of $9.45 by selling a hogshead of molasses at 60 cents a gallon.

9. A merchant makes a profit of 27 cents a yard on silk that cost $1.50.

10. A man sold a horse and carriage for $483 and made a profit of 15%. The carriage cost two-fifths as much as the horse. Find the cost of each.

LESSON 29.

1. I bought a horse for $175, kept it three years at an annual expense of $25, and sold it for 160% of the entire cost. Find the gain.

2. A man sold a house for $11700, which was $6300 less than he paid for it.

3. A grocer's profits for a year were $3248, which was 8% of his sales.

4. A merchant lost 5% on goods for which he received 76 cents a yard.

5. A drover bought 200 head of cattle at $40 a head and sold them for $9200.

6. A man bought land for $4500 and sold it at a loss of 15%.

7. A stationer sold paper at 31 cents a quire and gained $1.20 on a ream.

8. By selling land for $7.20 an acre below cost, a speculator lost 16%.

9. A man sold a mill for $1470 above cost. He paid $9800 for the mill.

10. A piece of land was sold for $5400, which was 116% more than it cost.

LESSON 30.

1. A merchant, in disposing of his stock of goods, received $14700 for them. The goods cost $16000.

2. A piece of land that cost $320 was sold at a profit of 212½%. How much was received for it?

3. A sold his farm for $6526 and lost $1274.

4. A man sold a piece of land for 212½% more than it cost and made a profit of $1700.

5. A grocer lost 84 cents a barrel on flour that cost $5.60. Find the loss per cent.

6. A merchant sold goods for $4250 and lost 15%. He invested the proceeds in land, which he sold at a profit of 50%. Find his net gain.

7. A fruit-dealer bought oranges at 16 cents a dozen and sold them at the rate of five cents for two.

8. A man bought 180 baskets of peaches for $135. Twenty baskets were spoiled, and he sold the remainder at a loss of 10%.

9. I sold a piece of land for $1475 and lost $525.

10. By selling a farm for $5350, a speculator gained $2850. Find the gain per cent.

LESSON 31.

1. I sold real estate for $92\frac{3}{4}\%$ of the cost, or $319 less than I paid for it. How much did I get for it?

2. Bought a horse, which I sold at an advance of 30%. With the money I bought another, which I sold for $364 and lost $12\frac{1}{2}\%$. Find the cost of each.

3. A merchant bought hats at $27 a dozen and sold them at a profit of $22\frac{2}{9}\%$.

4. An importer made $6900 on a cargo of goods by selling them at $9\frac{1}{5}\%$ above cost.

5. Two hundred barrels of flour were sold for $850, which was $22\frac{8}{11}\%$ less than it cost.

6. A house that cost $18500 was sold at a loss of $18\frac{1}{5}\%$.

7. A man sold twenty horses for 13% less than they cost. His loss was $325.

8. A man sold a cow for $700, which was $450 more than he paid for her.

9. A speculator made $3500 on grain that cost $42000.

10. There is a profit of 22% on a house sold for $10370.

LESSON 32.

1. Learn 173 . . . 184.

2. A sold a horse to B for $240. B sold the horse to C and gained thirty-five per cent.

3. A jeweler sold six watches at $125 apiece, receiving $150 less than he paid for them.

4. A grocer sold tea at an advance of 18 cents a pound and gained 40%.

5. A man sold property that cost him $27000 for $1170 below cost.

6. A speculator sold a house at a loss of eight per cent, and 'with the money bought another, which he sold for $5750 and gained 25%.

7. A man sold potatoes that cost $450, at a profit of 16⅓%, and apples that cost $350, at a loss of 28%.

8. A sold his stock of goods for 91⅔% of the cost, losing $1071.56.

9. There is a profit of 44 cents on flour sold at $5.94 a barrel.

10. A man sold a horse for $1650, which was 120% more than he paid for the horse.

11. A sold a house to B for $2200, and B sold it to C for $1912.

LESSON 33.

1. Bought a piece of land, which I sold at a profit of 20%. With the money I bought a span of horses, which I sold for $480 and lost 20%.

2. A druggist bought 160 gallons of alcohol at $2 a gallon. Ten gallons having leaked out, he sold the remainder for 32% more than it cost.

3. A merchant sold 150 yards of silk for $195, which was $205 less than he paid for it.

4. A builder received for a house and store $1750 more than they cost and made a profit of 15⅝%. The house cost 2⁄7 as much as the store.

5. There is a loss of 12½% on paper sold at 17½ cents a quire.

6. Property that cost $800 was sold for $1700.

7. A man bought land for $2050, kept it three years at an annual expense of $150, and sold it for 35⅕% less *than* the whole cost.

8. By selling cloth at 42 cents a yard less than cost, a merchant lost 24%.

9. A man sold a horse for $1300 and gained $1050.

10. A builder erected a house at a cost of $4200 and sold it at a profit of $595.

LESSON 34.

1. What is the value of 84% of 6175 bushels of wheat at $1.15 a bushel?

2. I deposited in a bank a sum equal to 27⅓% of what I already had in the bank, when my whole deposit amounted to $19100. Find the amount of the last deposit.

3. A man spent 9% of his money for a watch, 17% for clothes, and had $592 left.

4. I sold property for 15% less than it cost and received $11900 for it.

5. A man bought two horses for $375, paying $210 for the better one. What per cent of the entire cost was the cost of each?

6. A farmer raised 4500 bushels of wheat. He sold 30% of it at 65 cents a bushel, 34% of the remainder at 75 cents, and the remainder at 85 cents.

7. A man bought a horse for $156. ⅔ of the cost of the horse was equal to 65% of the cost of a carriage. Find the cost of both.

8. A man has $12150 in the bank, which is 170% more than he has in his safe. How much money has he?

9. After selling 1768 bushels of wheat, a farmer had 182 bushels left. What per cent of his crop had he left?

10. A man expended $2250 for improvements on his farm, which was 64% less than one-third the first cost.

LESSON 35.

1. A man bequeathed his property, amounting to $150000, as follows: 35% to his wife, 16⅔% of the remainder to each of his two daughters, and the remainder equally to his two sons.

2. In a school there are 323 boys and 527 girls. What per cent of the whole number is each?

3. A speculator sold grain for 8% more than it cost and received $18090 for it.

4. I added $612 to my money in the bank and increased my deposit 7½%.

5. Having lost 28% of my money in speculation, I have $17640 left. How much did I lose?

6. A farmer harvested 1275 bushels of grain 44% of which was wheat and the remainder barley.

7. A merchant's profits for the year increased his capital to $14448, which was 14⅔% more than his capital at the beginning of the year.

8. A farmer raised 99 bushels of wheat from 12 bushels of seed. What per cent of the seed was the increase?

9. In a school there are 493 boys, and this number is 42% less than the number of girls. How many pupils are there in the school?

10. A merchant pays $1800 a year rent for his store. 45% of this sum is 18% of one-half his profits.

LESSON 36.

1. A man having $4800 in a bank, drew out 14% of it at one time, 50% of the remainder at another time, and then deposited a sum equal to 120% of what he had drawn out.

2. If 21 gallons of water are added to 129 gallons of milk, what per cent of the mixture is each?

3. A man bought two houses for $6900, paying 30% more for one than he paid for the other. Find the cost of each.

4. I drew out 42% of my money in the bank. Of that sum I have spent $69.30, which is 18⅓% of what I drew out. How much had I in the bank?

5. My carriage cost $170, which was 32% less than the cost of my horse. Find the cost of both.

6. A farmer sold 65% of his crop of 1800 bushels of potatoes at 55 cents a bushel and the remainder at 85 cents a bushel.

7. I expended $2268 in repairs on my house, which was 8% more than ¼ the first cost.

8. A man bequeathed his property, amounting to $160000, as follows: $40000 to his wife, $24000 to a missionary society, and the remainder equally to his two sons. What per cent of the estate did each receive?

9. A man deposited 14½% of his money in a bank. He afterward drew out 17½% of his deposit and then had $5742 in the bank. How much money had he?

10. A widow received 40% of her husband's estate, and her daughter 26% of it, the widow receiving $10500 more than the daughter. Find each one's share and the amount of the estate.

LESSON 37. 1. Learn 173 . . . 184.

2. A druggist gained 110% on alcohol which he sold for $1.05.

3. A man bought a cow for $450 and sold her at a profit of 211⅑%.

4. There is a loss of 33 cents a yard on silk sold at $1.17.

5. A farm located near a city was sold for 325% more than it cost, giving the owner a profit of $10400.

6. A fruit-dealer bought a cargo of fruit for $14700 and sold it at loss of $756.

7. A carriage-maker sold two carriages for $312, which was 13⅓% less than they cost.

8. Goods that cost $764 were sold at a loss of 17½%.

9. I sold 84 acres of land at a loss of $644, which was 15⅓% of the cost.

10. I gained $2600 on property, which I sold for $3800.

11. A speculator sold two pieces of land for $1955 each, gaining fifteen per cent on one and losing the same per cent on the other.

LESSON 38.

1. How must a merchant mark cloth that cost $1.70 a yard, so that he may abate 15% and yet sell it at cost?

2. A man paid $17500 for land and sold it for 520% of the cost.

3. A fruit-dealer sold berries at 25 cents for two quarts and lost 80 cents on a bushel.

4. By selling forty cattle at an advance of $266, a drover gained 17½%.

5. A builder refused $4250 for a house, because he would lose 15% by selling at that price. He afterward sold the house for $5375.

6. A man bought a stock of goods for $200 less than their value, paying $1400 for them, and sold them at 12½% above their real value.

7. I bought a farm for $4650, and after keeping it three years, was obliged to sell it for 24% less than it cost.

8. Sold damaged flour at a sacrifice of $1.60 a barrel and lost 32%.

9. I sold real estate for $34300, which was $20300 more than I paid for it.

10. A man sold a horse that cost $120, at an advance of $140.

LESSON 39.

1. A man offered his farm for 124% more than he paid for it, but afterward sold it for $10920, which was 35% less than his first offer.

2. Bought nine books at $31.20 a dozen and sold them at $2.21 apiece.

3. A dealer bought shoes at $45 a dozen pair and marked each pair to be sold at a gain of 20%.

4. A speculator sold 150000 pounds of wool at 28 cents a pound, receiving $3000 less than he paid for it.

5. A dealer sold 65 tons of coal for 112% of the cost. His profit was $27.30.

6. A contractor built a section of railroad at a cost of $120000 and lost $3900.

7. A man sold six houses for $5200 apiece, losing 13⅓% on two of them and gaining four per cent on the others.

8. A bookseller bought books for 25% less than the list price and sold them at the list price.

9. There is a profit of $130 on medicines sold for $250.

To the Teacher. — Teach 185 . . . 191.

LESSON 40.

1. Learn 185 . . . 191.

2. A miller gave an agent 5% commission for selling 4000 barrels of flour at $5.10 a barrel.

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3. A commission merchant sold 450 barrels of flour at $4.60 a barrel and remitted to the consignor $1966.50.

4. An agent received $7119 to invest in wool, after deducting his commission of 5%.

5. A commission merchant received $43.20 for selling butter on 4½% commission.

6. The sum left from a sale was $798, after the agent's commission of $42 was taken out.

7. A lawyer collected a debt, took 8% for collecting, and remitted the remainder, which was $693.45.

8. A bought for B $3250 worth of goods on 3¾% commission.

9. A merchant received $3995 as the net proceeds of a sale of $4250 worth of goods.

10. A manufacturer sent his agent $8274 to invest in wool, after deducting his commission of 5%.

LESSON 41. 1. Learn 185 . . . 191.

2. A miller paid his agent 5% commission for selling flour. The commission amounted to $143.80.

3. A commission merchant remitted to a consignor $401.10 as the net proceeds of a sale. His commission was $18.90.

4. A commission merchant received $562.50 for selling $12500 worth of goods.

5. The sum left from a sale was $326.80, after deducting the agent's commission of 5%.

6. An auctioneer sold $1250 worth of furniture on 5½% commission.

7. An agent remitted $7999 from a sale of flour. He sold the flour for $8420.

8. An agent received $5768 to invest in building lots at $350 apiece, after taking out his commission of 3%.

9. An auctioneer sold a stock of goods for $\frac{2}{3}$ of their value on 4½% commission. His commission was $380.88.

10. Received $68 for selling 400 barrels of flour at $4 a barrel.

LESSON 42.

1. Learn 185 . . . 191.

2. A man received $250.99 for butter, which a commission merchant sold for him. The commission was $13.21.

3. A merchant received $79.81 for tea, which an agent sold for him on 8% commission.

4. A commission merchant's sales amounted to $215000 in a year, on which he averaged 4% commission.

5. An agent sold a house and lot for $18750, and the owner received $18187.50.

6. A merchant sent his agent $3159 to invest in flour, after deducting his commission of 4%.

7. A commission merchant received $161.50 for selling 680 barrels of flour on 5% commission.

8. An agent bought 18000 pounds of wool at 40 cents a pound and received $252 commission.

9. A farmer received $822.50 as the net proceeds of a sale of apples. The commission was $52.50.

10. After deducting his commission of 2%, a broker remitted $4777.50 to a speculator from a sale of corn.

LESSON 43.

1. An agent purchased $4000 worth of goods on 5% commission. His employer, changing his business, telegraphed the agent to sell the goods. The agent sold them at 5% less than the first cost on 5% commission.

2. A speculator received $5740 for land, which an agent sold for him for $6000.

3. A broker received $8970 with which to buy grain, after reserving his commission of 4%.

4. A manufacturer paid an agent $129.51 for selling goods on 4½% commission.

5. A commission merchant sold 1500 pounds of butter at 28 cents a pound, 2400 pounds of cheese at 9 cents a pound, and 250 bushels of potatoes at 75 cents a bushel. His commission was $32.94.

6. A broker remitted $142590 from a sale of wheat, after deducting his commission of $2910.

7. I received $854.40 for goods which an agent sold on 4% commission.

8. A merchant sent goods into the country to be sold on commission. The agent sold them and with the money bought 1805 barrels of flour at $5 a barrel, after deducting 5% commission for selling and 5% for buying.

9. A commission merchant sold produce for $2600, and after deducting his commission and $70 for other charges, he remitted to the consignor $2400.

LESSON 44.

1. Learn 185 . . . 191.

2. A merchant sent his agent $884 to invest in goods, after taking out his commission of 4%.

3. A commission merchant received $1680 for selling 150000 pounds of wool on 4% commission.

4. A manufacturer received $2422.50 for goods, which an agent sold on commission. The agent's commission was $127.50.

5. A commission merchant sold produce, and after

deducting his commission of 5% and $16.50 each for freight and storage, he remitted to the consignor $1240.

6. A commission merchant received $400 from a sale of apples. He invested the proceeds in other fruit, reserving 2½% for buying, 5% for selling, and $21.25 for other charges.

7. A farmer received $821.30 for his wool, which a commission merchant sold for $860.

8. An agent received $372.75 with which to purchase sugar at 4 cents a pound, after reserving his commission of 5%.

9. A commission merchant sold flour at $4.65 a barrel on 3% commission, which amounted to $373.86.

10. A lawyer received $39.90 for collecting a debt of $760.

LESSON 45. 1. Learn 185 . . . 191.

2. The net proceeds of a sale of flour were $4689.90. The commission was $170.10.

3. A man received $428.40 on a debt, which a lawyer collected for him on 10% commission.

4. An agent sold a section of land at $22 an acre and received a commission of 4½%.

5. A commission merchant sold goods to the amount of $4500, and after deducting his commission, he remitted to the consignor $4320.

6. A grocer remitted to his agent in the country $285.60 with which to buy butter at 32 cents a pound, after deducting his commission of 5%.

7. A commission merchant received $39.30 for selling produce on 5% commission.

8. A commission merchant sold $1500 worth of produce

and retained $100, which included his commission and $20 for other charges.

9. A commission merchant sent $926.40 to a farmer as the proceeds of a sale of potatoes. The commission was $38.60.

10. An agent paid $108 charges on a shipment of fruit. He sold the fruit on 1½% commission and remitted to the shipper $12500.

LESSON 46.

1. Learn 173 . . . 184.

2. Sold a horse so that ¾ of the gain equaled ½ of the cost. Find the gain per cent.

3. A man sold a piece of property for 91⅔% of the cost, or $2000 less than he paid for it.

4. A man sold his house and lot for $4152 and made a profit of 15⅓%. The lot cost two-sevenths as much as the house.

5. I sold a carriage at 33⅓% profit, and with the money bought another, which I sold for $180 and lost 25%.

6. A merchant imported 1800 yards of silk at $1.25 a yard. 250 yards being damaged in transportation, he sold the remainder at an advance of 20% on the whole cost.

7. I lost $260 by selling 6500 bushels of wheat at 76 cents a bushel.

8. Jones sold a horse to Brown for 233⅓% of the cost, or $600 more than he paid for it. Brown sold the horse to Davis at a loss of 33⅓%.

9. A man offered his farm for sale at 15% below cost, but afterward sold it for $6460, which was 5% less than his first offer.

10. A bought a horse for $200. He sold the horse to B for $260, and B sold it to C for $325.

11. A speculator bought potatoes for $4800 and sold them at a loss of $8\frac{1}{2}$%.

LESSON 47.

1. A man sold a section of land at $11 an acre and received $4480 more than he paid for it.

2. A man sold real estate at a profit of 140%, and with the money bought other property, which he sold for $4860 and lost 55%.

3. What per cent is gained or lost when an article is sold for $\frac{4}{5}$ of the cost? $\frac{5}{4}$? $\frac{5}{6}$? $\frac{2}{3}$? $\frac{7}{5}$? $\frac{7}{6}$? $\frac{8}{9}$?

4. How much must a clothier ask for a suit of clothes that cost $28, so that he may reduce his first price $12\frac{1}{2}$% and still make a profit of 25% ?

5. A merchant asked 8% more for his stock of goods than they cost him, but was finally obliged to sell them for 25% less than he asked, losing $2850.

6. Sold a horse for $258, thereby losing 14%. Bought five carriages at $140 apiece and sold them so as to gain as much as I lost on the horse.

7. What per cent does a merchant gain on his investment, if 20% of his sales is profit?

8. Bought a house for $7200. Paid $1500 for repairs, 20% of the cost of repairs for painting, and then sold it at a net profit of $11\frac{1}{3}$%.

9. A speculator lost $1122 on real estate, which he sold for $7378.

10. A jeweler sold two watches at a profit of $48.40, which was 22% of their cost. The better watch cost $1\frac{3}{4}$ times as much as the other.

LESSON 48. 1. Learn 185 . . . 191.

2. An agent sold flour for $8900, and out of the proceeds bought 3500 bushels of wheat at 90 cents a bushel, and remitted the remainder to the consignor. The agent's commission was 5 % both for buying and selling.

3. A man received $34560 for 40000 bushels of wheat, which a commission merchant sold for him at 90 cents a bushel.

4. An agent received $2508 to invest in flour, after taking out his commission of 4½%.

5. A farmer paid a commission merchant $29.60 for selling 1850 pounds of wool on 5% commission.

6. An agent sold a house for $8750 and received $280 commission.

7. A speculator received $66300 for grain, which he sent to an agent to be sold. The commission was $1700.

8. The proceeds of a sale of a section of land were $3300, after the agent had taken out his commission of 5% and $44 for other charges.

9. An agent sold a house and invested the proceeds in land, after taking out his commission of 5% for selling the house and 4% for buying the land. The land cost $4750.

10. A merchant sent goods into the country to be sold. The agent sold them for $1785 and remitted to the merchant $1570.80.

LESSON 49.

1. An agent received a remittance of $3800 with which to buy potatoes at 65 cents a bushel, after taking out his commission of 4% and $82 to pay other charges.

2. A commission merchant sold butter at 28 cents a pound on 5% commission. His commission was $109.90.

3. A commission of $66 was charged for selling $1650 worth of goods.

4. The net proceeds of a sale of 560 barrels of flour were $2400, after deducting the commission of $128.80 and $47.20 for other charges.

5. An agent sold a house on 5% commission and sent to the owner $6080.

6. A lawyer collected a debt amounting to $1575 and charged 12% commission.

7. A speculator received $5740 for 150 head of cattle, which an agent sold for him at $40 a head.

8. An exporter sent to his agent $82620 to invest in a shipment of corn at 45 cents a bushel, after deducting his commission of 2%.

9. An agent received $232 for selling a half-section of land on 5% commission.

TO THE TEACHER. — Teach 192 . . . 199.

LESSON 50. 1. Learn 185 . . . 191.

2. An agent sent his employer $8600, the amount due him on a consignment of wool, sold at 20 cents a pound. The agent deducted his commission of $300 and $100 for freight.

3. A speculator received $68500 for 85000 bushels of wheat, the broker retaining his commission of 2% and $222.50 to pay freight.

4. An agent sold 13125 bushels of wheat at 80 cents a bushel on 5% commission. He invested the proceeds, less 5% for buying, in flour at $5 a barrel.

5. An agent sold a farm for $16500 and remitted to the owner $15972.

6. An agent received $6552 to invest in wool at 26 cents a pound, after deducting his commission of 5%.

7. A commission merchant received $307.44 for selling goods on 3½% commission.

8. An auctioneer received $292.50 for selling $4500 worth of goods.

9. A farmer received $600 for 875 bushels of potatoes, which a commission merchant sold for him. The agent deducted his commission of $42 and $58 to pay for transportation.

10. A commission merchant remitted to a consignor $460.75 from a sale of produce, after reserving his commission of 5%.

To THE TEACHER. — Teach 192 . . . 199.

ORAL EXERCISES.

1. What is 8% of 400? 10% of 320 boys? 33⅓% of 24 books? 75% of 200 sheep? 25% of a square foot?

2. 8 is 10% of what number? $16 is 25% of what sum? 20 is 16⅔% of what number? 90 cents is 75% of what sum? One quart is 25% of what?

3. What per cent of 24 is 3? Is 12? Is 18? Is 6? Is 15? Is 9? Is 48? Is 36?

4. What number increased by 12½% of itself equals 72? By 50%, equals 21? By 75%, equals 35? By 100%, equals 160? By 25%, equals 55? By 10%, equals 66?

5. What number diminished by 50% of itself equals 15? By 25%, equals 36? By 12½%, equals 42? By 40%, equals 45? By 33⅓%, equals 44? By 10%, equals 72?

6. What is 9% of $600? 50% of an acre? 16⅔% of a square foot? 100% of 7? 150% of 4 quarts?

7. Find the number of which 63 is 87½%. Of which 108 is 9%. Of which 25 cents is 20%. Of which one pound is 66⅔%. Of which 75 is 125%.

8. 14 is what per cent of 200? Of 28? Of 7? Of 70? Of 84? Of 112? Of 21?

9. What sum increased by 20% of itself equals $4.20? By 150%, equals 25 cents? By 37½%, equals $4.40? By 66⅔%, equals $80? By 40%, equals $4.90?

10. What number diminished by 33⅓% of itself equals 26? By 75%, equals ¼? By 20%, equals 60?

11. What is 20% of a ton? 125% of 2 hours? 37½% of 64 bushels? 66⅔% of $270? 16⅔% of a gross?

12. What per cent of \$50 is \$10? Of 2 days is 16 hours? Is a yard of a foot? Of a foot is 2 inches?

13. What number increased by 33⅓% of itself equals 60? By 62½%, equals 26? By 200%, equals 1? By 16⅔%, equals 140? By 10%, equals 132?

14. A bushel is 400% of what? 50 is 62½% of what number? \$2.10 is 12½% of what sum? One foot is 33⅓% of what?

15. What number diminished by 16⅔% of itself equals 55? By 80%, equals 7? By 37½%, equals 80? By 66⅔%, equals 23? By 10%, equals 72?

16. What is 25% of a gross? 12½% of 40 cents? 150% of \$15? 7% of 900 men? 60% of 65?

17. \$2.70 is 37½% of what sum? 100 is 133⅓% of what number? 240 is 50% of what number?

18. 45 is what per cent of 120? Of 72? Of 60? Of 15? Of 450? Of 90? Of 900?

19. 720 is 12½% more than what number? 60%? 125%? 20%? 80%? 300%?

20. What number diminished by 62½% of itself equals 60? By 25%, equals 120? By 12½%, equals 84?

21. A farmer raised 800 bushels of potatoes and sold 25% of them at 50 cents a bushel.

22. What per cent of 15 is 20? Is 12 of 120? Of \$8 is 64 cents? Is 100 of 80? Of 75 is 15?

23. What number increased by 25% of itself equals 250? By 40%, equals 560? By 87½%, equals 45? By 133⅓%, equals 350? By 60%, equals 64?

24. The number of children in a town is 625, which is 25% of the population. Find the population of the town.

25. What number diminished by 50% of itself equals 75? By 87½%, equals 20? By 40%, equals 90? By 33⅓%, equals 160? By 12½%, equals 490? By 60%, equals 80?

26. A man bought a house for $4000 and paid $1500 on it. What per cent of the cost remained unpaid ?

27. A man sold a cow for $88, which was 37½% more than the cost. Find the gain.

28. A boy had 60 marbles. He won 25% as many more and then lost 20% of all he had. How many had he left ?

29. I sold a piece of land for 20% less than it cost and received $1000 for it. How much did I lose ?

30. 5 is 125% of what number? $64 is 8% of what sum ? 50 is 12½% of what number ? One yard is 150% of what ?

31. What is 200% of 50 cents? 62½% of 2 pounds? 6% of 650 acres ? 133⅓ of $90 ?

32. 70 is 25% more than what number? 16⅔%? 66⅔% ? 75% ? 400%? 133⅓% ?

33. What per cent of a dozen is a score ? Is a peck of a bushel ? Of $99 is $66 ? Is 14 ounces of a pound ?

34. What number diminished by 75% of itself equals 150 ? By 20%, equals 120 ? By 10%, equals 108 ? By 16⅔%, equals 400 ? By 40%, equals 69 ?

35. A city increased in population 18000 in five years, which was 150% of the population before that time. What was the population of the city after the increase ?

36. A man invested $12000 in a manufacturing business, which pays him an annual income of 9% on his investment.

37. 16 is 16⅔% of what number? Six hours is 25% of what? 160 is 33⅓% of what number? $180 is 66⅔% of what sum ?

38. From a cask containing 60 gallons of oil 45 gallons leaked out. What per cent remained ?

39. After a man's salary had been increased 20%, he received $1800. How much was it increased ?

40. A has 180 sheep, which is 40% less than the number owned by B. How many have both?

41. A clerk receives a salary of $1500, 16⅔% of which he spends for clothes. How much does he save?

42. What per cent of half a yard is a foot? Is $72 of of $800? Of a quart is a gallon? Is $60 of $1000?

43. What number increased by 10% of itself equals 55? By 50%, equals 48? By 33⅓%, equals 600? By 125%, equals 18? By 20%, equals 36?

44. A farmer sold 60 sheep, which was 37½% of his flock. How many had he left?

45. What number diminished by 80% of itself equals 14? By 37½%, equals 250? By 66⅔%, equals 80?

46. A piece of land is 16 rods wide and 24 rods long. What per cent is each dimension of the other?

47. What is 33⅓% of 630 men? 87½% of 160 trees? 300% of $120? 16⅔% of 96?

48. 105 is 37½% of what number? 87½%? 50%? 62½%? 300%? 75%?

49. A owes $6000, which is 25% more than he is worth. How much is he worth?

50. The population of a town has decreased 12½%. If it is 560 now, how much has it decreased?

51. A boy earned $2.40 and gave his mother 66⅔% of it. How much had he left?

52. A young man's expenses are $750 a year, which is 62½% of his salary. How much does he save?

53. What per cent of 90 is 135? Is 30 of 180? Of $72 is $27? Of 160 is 120?

54. What number increased by 37½% of itself equals 121? By 100%, equals 1? By 60%, equals 64?

55. What number diminished by 87½% of itself equals 15? By 60%, equals 50? By 12½%, equals 105? By 50%, equals 150? By 20%, equals 88?

56. 400% of 5 is 20% of what number?

57. What is 20% of 5 cents? 400% of 3 inches? 50% of 860 children? 12½% of $560?

58. A boy bought 24 papers and sold 16 of them. What per cent of his papers had he left?

59. John earns $9 a week, which is 66⅔% more than Harry earns. How much do both earn?

60. Having lost 50% of my money in speculation, I have $12500 left. How much had I at first?

61. A man inherited $16000. He invested 10% of it in land, 62½% in government bonds, and bought a house with the rest. How much did the house cost?

62. A merchant drew $450 from the bank, which was 75% of his deposit. How much had he left in the bank?

63. What per cent of a ton is 500 pounds? Is a quart of a pint? Of a day is 8 hours? Of $160 is $140?

64. What number diminished by 25% of itself equals 180? By 40%, equals 120? By 75%, equals 600? By 33⅓%, equals 70?

65. What number increased by 40% of itself equals 280? By 62½%, equals 52? By 80%, equals 180? By 150%, equals 80?

66. A man having $720 in a bank drew out 12½% of it at one time and 37½% of it at another time.

67. A man bought a farm for $12000, paying $9000 on it. What per cent of the cost remained unpaid?

68. A man owing a sum of money discharged 20% of the debt by paying $160. How much did he still owe?

69. A has 150 sheep, which is 87½% more than B has. How many have both?

70. A man expended $1800 in repairs on his house, which was 10% less than ⅕ the cost. Find the cost.

71. What per cent of ⅛ is ¼? Of ⅔ is ⅙? Of a mile is 64 rods? Is 4 dozen of a gross? Of a square yard is 4½ square feet?

72. What is 87½% of $4.80? 75% of a mile? 200% of $45? 66⅔% of 75 books? 40% of a ton?

73. What number increased by 25% of itself equals 300? By 200%, equals 225? By 33⅓%, equals 240? By 40%, equals 175? By 20%, equals 132?

74. 62½% of $40 is 10% of what sum?

75. What number diminished by 16⅔% of itself equals 250? By 62½%, equals 24? By 20%, equals 48? By 10%, equals 72? By 12½%, equals 210?

76. A man bought city property for $7500 and sold it for 100% more than it cost.

77. A man invested $8000 in mining stock, on which he receives an annual income of $800.

78. My income this year is $1800, which is 125% more than it was last year. How much was it last year?

79. I have paid $500 on a debt, which is 66⅔% of what I still owe. How much was the debt?

80. After a man's salary had been reduced 12½%, he received $1050. How much was it reduced?

81. A boy caught 32 fish and sold 37½%of them at 20 cents apiece. How much did he receive for them?

82. A farmer sold 15 sheep out of a flock of 120. What per cent of his flock had he left?

83. By depositing $900 in the bank; I increased my deposit 75%. How much had I in the bank then?

84. What number increased by 12½% of itself equals 540? By 16⅔%, equals 84? By 100%, equals ¼? By 60%, equals 176?

85. 60 is 60% less than what number? 87½%? 66⅔%? 37½%? 80%?

86. If a pint of water is added to three pints of alcohol, what per cent of the mixture is each?

87. A man bought a horse for $250 and sold it for 400% of the cost. How much did he gain?

88. 8% of 2000 is 20% of what number?

89. A boy paid 50 cents for a bat, which was 60% less than he paid for a ball. Find the cost of both.

90. A has 225 sheep, which is 50% more than B has. How many have both?

91. A clerk who had received $1200 a year had his salary reduced 10%. How much did he receive then?

92. My sales amounted to $21000 in 1887, which was 87½% of my sales in 1886.

93. A man worth $40000 bequeathed $16000 to his wife and the remainder equally to his three children. What per cent of the estate did each receive?

94. A flock of sheep has been increased by 75% of the original number and now contains 280.

95. A farmer bought a horse and cow for $300, paying 80% less for the cow than he paid for the horse.

96. A boy bought a ball for 75 cents, which was 10% of his money. How much money had he left?

97. A man bought property for $7000 and at the end of a year sold it for 150% of the cost. Find his gain.

98. The number of girls in a school is 450, which is 50% more than the number of boys.

99. A man bought a horse and carriage for $600, paying $150 for the carriage. What per cent of the whole cost was the cost of each?

100. The length of a rectangular plot of ground is 60 feet, which is 20% less than three times the width.

101. A man bequeathed his property, valued at $48000, as follows: 50% to his wife and the remainder equally to his three children. How much did each receive?

102. A farmer sold 35 sheep, which was 12½% of his flock. How many had he left?

103. In a school of 426 pupils there are 142 boys. What per cent of the whole number is each?

104. After a man had increased his deposit in the bank 40%, he had $4200 in the bank. How much was his last deposit?

105. A man sold a farm for 62½% less than it cost and received $4500 for it. How much did he lose?

106. A farmer bought 50 sheep and thereby increased his flock 33⅓%. How many has he now?

107. A man deposited $600 in a bank. He drew out 25% of it, then 33⅓% of the remainder, and afterward deposited a sum equal to 200% of what he had drawn out.

108. In ten years a city has increased in population 60%, and now it is 40000. What is the increase?

109. I bought land for $15000, and it brings me an annual income of $2500. What per cent of the cost is the income?

110. A man sold his house for 12½% less than he asked for it, receiving $3500 for it. How much did he ask for it?

111. A man worked 66⅔% of 18 days at $2.50 a day.

112. A widow received $15000 from her husband's estate, which was 33⅓% of the estate.

113. If three gallons of whiskey are mixed with 21 gallons of cider, what per cent of the mixture is each?

114. A man's debts amount to $5400, which is 80% more than he is worth. How much is he worth?

115. A lady bought a dress and hat for $27, paying 50% less for the hat than she paid for the dress.

116. After spending 62½% of his salary, a young man saves $600. How much does he spend?

117. A farmer harvested 11 bushels of wheat from a bushel of seed. What was the per cent increase?

118. A man owing $600 paid 37½% of it at one time and 50% at another time. How much did he then owe?

119. My house cost $8000, which was 33⅓% less than the cost of my store. Find the cost of both.

120. A merchant's sales this year amount to $48000, which is 50% more than they were last year.

121. A man invested $10200 in oil lands, and the investment pays him an annual income of 66⅔%.

122. There are 120 boys in a school, which is 20% of the whole number of pupils. How many girls are there?

123. After selling 24 sheep, a man had 96 left. What per cent of his flock did he still have?

124. A man sold a piece of land for 25% more than it cost, receiving $3750 for it. How much did he gain?

125. A merchant sold a coat for $15, which was 16⅔% less than the cost. Find the loss.

126. John picked 48 quarts of berries. He sold 33⅓% of them to a lady, 50% of them to a grocer, and gave the remainder to his mother.

127. In an orchard there are 200 apple-trees and 120 peach-trees. What per cent of the whole number is each kind?

128. I drew out 50% of my deposit in the bank. Of this sum I spent $150, which was 62½% of what I drew out.

129. After a man had sold 10% of his sheep, he had 225 left. How many did he sell?

130. A man expended $2200 in repairs on his house, which was 10% more than ½ the cost. Find the cost.

131. A farmer raised 5600 bushels of grain, 87½% of which was corn.

132. A man sold a piece of land and gained $250, which was 16⅔% of the cost.

133. A man having 1200 sheep sold 150 of them. What per cent of his flock had he left?

134. I bought two farms for $14000, paying 33⅓% more for one than for the other. Find the cost of each.

135. A newsboy has 18 papers, which is 60% less than the number he has sold. How many had he at first?

136. I paid 25% of my money for a carriage which cost $175. How much money had I left?

137. A farmer sold cows and sheep for $1500, receiving $600 for the sheep. What per cent of the whole sum did he receive for each?

138. A young man inherited $6400 and lost 87½% in speculation. How much had he left?

139. A's income this year is $1600, which is 60% less than it was last year. How much was it last year?

140. My watch cost $200, which was 150% more than the cost of the chain. Find the cost of both.

141. A man worth $80000 bequeathed 75% of it to his wife and the remainder to benevolent institutions.

142. A creditor paid me $60, which is equal to 66⅔% of what he still owes me. How much was the debt?

143. A man gave $9000 to his wife and four sons, giving his wife $4500 and dividing the remainder equally among his sons. What per cent of the whole amount did each receive?

144. After a farmer had increased his flock of sheep 37½%, his flock numbered 330. How many did he add?

145. A merchant sold a suit of clothes for 16⅔% less than they cost and received $12.50 for them.

146. A boy earned 48 cents and spent 75% of it for candy. How much had he left?

147. After paying me $90, a man still owes me $60. What per cent of the debt did he pay?

148. A boy spends $120 for a bicycle and has 33⅓% of his money left. How much had he left?

149. A man paid $200 for a carriage, which was 33⅓% more than ¼ the sum paid for a horse. Find the cost of both.

150. A man bought two carriages for $400, paying 40% less for one than for the other. Find the cost of each.

151. From a cask containing 30 gallons of wine, 11 gallons and one quart leaked out. What per cent remained?

152. What is the value of 12½% of 320 barrels of apples at $2.50 a barrel?

153. A man bought a carriage for $240. ⅛ of the cost of the carriage was equal to 10% of the cost of a horse.

154. A man has $48000 invested in government bonds, which is 200% more than he has invested in real estate.

155. I have reduced my deposit in the bank 25%, leaving $4500 in the bank. How much did I take out?

156. A man bought a city lot for $1500 and sold it at a profit of 133⅓%. Find the sum received for it.

157. There are 125 female prisoners in a prison, which is equal to 12½% of the number of male prisoners.

158. If 21 quarts of water is added to 42 quarts of milk, what per cent of the mixture is each?

159. A farmer paid $350 for a span of horses, which was 75% more than he paid for a wagon. Find the cost of both.

160. A man bought a coat for $20, which was 37½% less than eight times the sum paid for a hat.

161. A man drew out 75% of his deposit in a bank. He paid 87½% of the sum drawn out for a horse, which cost $210. Find the sum taken out of the bank.

162. A lady bought two pair of shoes for $7.20, paying 66⅔% more for one pair than she paid for the other.

163. A man invested $12000 in a business which brings him an annual income of $1080. What per cent of the investment is the income?

164. A laborer dug 600 bushels of potatoes for 10% of them and sold his share for 80 cents a bushel.

165. A boy earns $9 a week, which is 40% less than his father earns. How much do both earn?

166. A man expended $2400 in improvements on his farm, which was 20% more than ½ the cost of the farm.

167. A clerk spent 12½% of his salary for clothes, 25% for board, and saved $750. How much was his salary?

168. A merchant sold a coat for 33⅓% less than it cost, receiving $16 for it. How much did he lose?

169. A farmer raised 12½ bushels of beans from 2½ bushels of seed. What was the per cent increase?

170. A miller made 400 barrels of flour. He sold 62½% of it at $4 a barrel, 12½% of it at $4.50 a barrel, and the remainder at $5 a barrel.

171. A speculator sold real estate for 66⅔% more than it cost, receiving $25000 for it. Find his gain.

172. A man drew $50 from a bank and had $350 left on deposit. What per cent of his deposit remained?

173. A man bequeathed his estate to his wife, son, and daughter. The wife's share was 50%. The son received $14000, which was equal to 87½% of the daughter's share. What was the whole amount of the estate?

174. There are 480 trees in an orchard, 37½% of which are apple-trees, 16⅔% of which are pear-trees, and the remainder peach-trees.

175. After a man had given away 20% of his money, he had $60000 left. How much did he give away?

176. A man worth $54000 bequeathed $18000 to his wife and the remainder equally to his six children. What per cent of the estate did each receive?

177. A invested $8000 in a mining company. B's investment was equal to 125% of A's, and C's was equal to 300% of B's.

178. A sold 33⅓% of a half interest in a mill for $3000. What was the value of the mill?

179. A boy bought a ball for $1.08, which was 80% more than he paid for a knife. Find the cost of both.

180. A man bought a watch for $80, which was 66⅔% less than six times the sum paid for a chain.

181. A man sold 25% of a section of land at $45 an acre. How much did he receive for it?

182. It took 37½% of John's money to buy a watch for $36. How much money had he left?

183. In a prison there are 175 female and 350 male prisoners. What per cent of the whole number is each?

184. A wife received $35000 from her husband's estate, which was 16⅔% more than the daughter received.

185. A boy bought a sled and a pair of skates for $5.60, paying 25% less for the skates than he paid for the sled.

186. After spending 25% of her money for a ring, a lady had $36 left. Find the cost of the ring.

187. A man bought a horse and cow for $300, paying $60 for the cow. What per cent of the whole cost was the cost of each?

188. A man having $1500 in a bank drew out 16⅔% of it at one time and 20% of the remainder at another time.

189. A farmer paid $300 for sheep, which was 37½% less than he paid for cows. Find the cost of both.

190. I bought a house for $7000, which was 16⅔% more than ¾ the sum paid for a store. Find the cost of both.

191. What cost 33⅓% of 135 sheep at $4 a head?

192. A man gave his daughter $4000. ⅜ of this sum was equal to 12½% of what he gave his son.

193. If in an alloy of 56 ounces of silver and gold there are 21 ounces of silver, what per cent of the whole is each?

194. A man bought two cows for $126, paying 10% more for one than he paid for the other.

195. A merchant's profits this year are $1500, which is 75% less than they were last year.

196. A clerk drew 66⅔% of his monthly salary. Of the sum received he spent 16⅔% for a watch costing $100.

197. A man owing $640 paid 62½% of it at one time and 10% of it at another time.

198. My house cost $6000, which was 400% more than I paid for the lot. Find the cost of both.

199. After spending $14 for a suit of clothes, a man had $126 left. What per cent of his money did he spend?

200. A man sold city property for $30000, which was 33⅓% less than it cost. How much did he lose?

SEVENTH GRADE — SECOND TERM.

LESSON 1. 1. Learn 192 . . . 199.

2. What does an insurance of $7500 cost at 1½% ?

3. The premium for insuring a house for its full value at ¾% is $56.25. Find the value of the house.

4. A house was insured for $4800 and the premium was $72. Find the rate of premium.

5. For what sum must a house valued at $24500 be insured at 2% to cover its full value ?

6. A house worth $3500 is insured for its full value at ¾%.

7. A man paid $174 for insuring his house, valued at $14500.

8. It cost $625 to insure a stock of goods for their full value at 2½%.

9. I saved $4334 by having my house insured for its full value at 1½%. Find the premium.

10. A church valued at $60000 is insured at 1¼% for ⅘ of its value.

LESSON 2. 1. Learn 192 . . . 199.

2. A man insured his store for its full value at ⅘%, paying a premium of $56.

3. A insures his store for $8500, which is its full value, paying a premium of $136.

4. For what sum must I get my library insured at ¾% to cover a loss of $595.50 ?

5. What is the premium for insuring a house valued at $12000 for its full value at ¾% ?

6. Several buildings were insured for $68000, on which the premium was $1020.

7. The premium for insuring 3500 barrels of flour for its full value at 1½% was $210.

8. A man has a house worth $4900, which he insures at 2% so that, in case of its destruction, he will lose nothing.

9. My house worth $6500 and my furniture worth $2200 are both insured at 1¼% for their full value.

10. I paid $13.50 for insuring my furniture for its full value at ¾%.

To the Teacher. — **Continue frequent drill on the oral exercises following the work of Seventh Grade, First Term.**

LESSON 3. 1. Learn 192 . . . 199.

2. For what sum must a stock of goods valued at $42900 be insured at 2½% to cover their full value ?

3. I paid $420 for insuring a stock of goods for their full value, which was $16800.

4. What is the premium for insuring a stock of goods worth $22500 for ⅔ of their value at 1¼% ?

5. A insured his property for ⅔ of its value at 75 cents a $100, paying a premium of $48.

6. A store valued at $4500 is insured for its full value for a premium of $54.

7. My store was burned, but I saved $11700 by having it insured for its full value at 2½%.

8. A house valued at $24000 was insured for its full value at $.75 a $100.

9. My library is insured for $1200, which is its full value. The premium is $21.

10. A house is insured for its full value at ¾%. The premium is $45.

LESSON 4.

1. For what sum must a cargo of flour valued at $32835 be insured at ½% so that, in case of its destruction, the owner will lose nothing?

2. What is the cost of insuring a mill valued at $16000 for its full value at 1½%?

3. The premium for insuring a house and store for ¾ of their value at 1¼% is $150. The store is worth 2⅓ times as much as the house.

4. A pays $90 for insuring a quantity of flour for ¾ of its value. The flour is worth $24000.

5. I saved $4455 by having my buildings insured for ¾ of their value at 1%.

6. I insured my library for ¾ of its value at 1¼% and paid a premium of $15.

7. A man has a store worth $6500, which is insured for its full value at ¾%.

8. A house valued at $4400 is insured for its full value. The premium is $33.

9. For what sum must a man have his buildings insured at 1½% to cover a loss of $7880?

LESSON 5.

1. What is the cost of insuring a cargo of wheat worth $32000 for ¾ of its value at 1¾%?

2. A man paid $1875 for insuring a block of buildings for ¾ of their value at 2½%.

3. Paid $60 for insuring my house for $4800, which was its full value.

4. A merchant saved $15800 by having his goods insured for their full value at 1¼%.

5. A stock of goods worth $14400 was insured at $1.50 a $100 for ¾ of their value.

6. A vessel and cargo are insured for $240000, which is ¾ of their value. The premium is $1800.

7. The premium for insuring a cargo of wheat for ⅘ of its value at 2½% was $400.

8. For what sum must a stock of goods valued at $6288 be insured at 1¾% so that, in case of their destruction, the owner will lose nothing?

9. A man paid $306 for an insurance on 8500 barrels of flour, insuring it for $20400, or ¾ of its value.

To the Teacher. — Teach 200 . . . 211.

LESSON 6.

1. Learn 200 . . . 211.

2. Prepare the table to be used in making the tax-roll when the tax to be raised is $8750 and the total valuation of property on the assessment-roll is $2146500.

3. Prepare the table to be used in making the tax-roll when the tax to be raised is $4750 and the total valuation of property on the assessment-roll is $1675800.

To the Teacher. — Frequently require pupils to give the tax on different sums so that they will understand the use of the table.

LESSON 7.

1. Learn 200 . . . 211.

2. Prepare the table to be used in making the tax-roll when the tax to be raised is $47280 and the total valuation of property on the assessment-roll is $15475850.

3. Prepare the table to be used in making the tax-roll when the tax to be raised is $1575 and the total valuation of property on the assessment-roll is $225750.

To the Teacher. — Teach 212 . . . 215.

LESSON 8. 1. Learn 212 . . . 215.

2. What is the duty, at 15% *ad valorem,* on $24750 worth of silk?

3. Find the duty, at 22% *ad valorem,* on 165 chests of tea, each containing 45 pounds, invoiced at 48 cents a pound.

4. What is the duty, at 35% *ad valorem,* on 675 yards of broadcloth, invoiced at $1.85 a yard?

5. Find the duty, at 28 cents a pound, on 65 cases of tobacco, each weighing 175 pounds.

6. Find the duty, at 35% *ad valorem,* on 1250 yards of lace, invoiced at $1.25 a yard.

7. What is the duty, at 1¾ cents a pound, on 4800 pounds of rice?

8. A merchant imported 2250 yards of silk, invoiced at $1.85 a yard. What was the duty at 45% *ad valorem?*

9. A merchant imported 35 hogsheads of molasses, each containing 78 gallons, invoiced at 48 cents a gallon. What was the duty, at 15% *ad valorem,* after deducting 10% for leakage?

10. What is the invoice cost of goods, when the duty at 25% amounts to $424?

11. A merchant imported 45 casks of wine, each containing 32 gallons, the duty at 15% amounting to $540. What was the invoice price per gallon?

LESSON 9. 1. Learn 192 . . . 199.

2. A manufacturer insured his building and machinery for ⅘ of their value at 1½%, paying a premium of $360. The machinery was worth ⅕ as much as the building.

3. My house worth $4800, which was insured for ⅚ of its value at ¾%, was destroyed by fire. What was my loss?

4. I insured my house for ¾ of its value at 1¼%. The house was destroyed, and my loss was $1245. Find the value of the house.

5. A house valued at $9000 is insured for ⅔ of its value at ¾%. If it is destroyed, what will be the owner's loss?

6. It cost $157.50 to insure property for 6/7 of its value at $1.25 a $100.

7. A building valued at $40000 is insured for ⅘ of its value. The premium is $240.

8. For what sum must a merchant have his store insured at 2% to cover a loss of $14700?

9. A store worth $8500 is insured at 1½% for ⅗ of its value.

10. A man paid $136 for an insurance on 40000 bushels of wheat, insuring it for $27200, or ⅘ of its value.

11. A cargo of flour was insured for ⅘ of its value at $1.50 a $100. The premium was $270.

LESSON 10.

1. A merchant has a stock of goods worth $12245. He insures them at 1¼% so that, in case of their destruction, he will lose nothing.

2. An elevator is valued at $24000. The owner insures it for ⅚ of its value at ¾%, and the grain in it for $25000, or ⅚ of its value, at ½%.

3. A man insures 750 barrels of flour for $\frac{2}{3}$ of its value at $2\frac{1}{2}\%$, paying a premium of $50.

4. A speculator bought 50000 pounds of wool and insured it for $12800, which was $\frac{4}{5}$ of its value, paying a premium of $96.

5. For. what sum must a house valued at $5200 be insured at $2\frac{1}{2}\%$ to cover $\frac{3}{4}$ of its value?

6. A merchant had 2400 barrels of flour worth $4 a barrel. He insured it for $\frac{3}{4}$ of its value at $1\frac{1}{4}\%$. A fire occurring, he saved 500 barrels. Find his loss.

7. A man paid $400 to have his factory insured for $32000, which was $\frac{2}{3}$ of its value.

8. A insured a stock of wool for $\frac{7}{8}$ of its value at 2%. The wool was destroyed, and he lost $2280. Find the value of the wool.

9. Goods were insured for $\frac{3}{4}$ of their value at $1\frac{1}{4}\%$. The premium paid was $157.50.

10. My store worth $8000 and goods worth $5500 were insured, the former for $\frac{3}{4}$ of its value at $1.25 a $100, and the latter for $\frac{4}{5}$ of their value at $1\frac{1}{2}\%$. A fire occurring, I saved $1500 worth of the goods. What was my loss?

LESSON 11.

1. Forty carriages were insured for $4200, which was $\frac{3}{4}$ of their value. The premium was $31.50.

2. A man paid $315 for insuring his store and goods for $\frac{7}{8}$ of their value at $1\frac{1}{2}\%$. The goods were worth twice as much as the store.

3. A man saved $10638 by having 45000 pounds of wool insured for $\frac{4}{5}$ of its value at $1\frac{1}{2}\%$.

4. A factory cost $21000. It is insured for $\frac{6}{7}$ of its value at two per cent. The machinery is insured at 1% for $8000, or $\frac{4}{5}$ of its value.

LESSON 9.

1. Learn 192 . . . 199.

2. A manufacturer insured his building and machinery for $\frac{4}{5}$ of their value at $1\frac{1}{2}\%$, paying a premium of $360. The machinery was worth $\frac{1}{5}$ as much as the building.

3. My house worth $4800, which was insured for $\frac{5}{6}$ of its value at $\frac{3}{4}\%$, was destroyed by fire. What was my loss?

4. I insured my house for $\frac{3}{4}$ of its value at $1\frac{1}{4}\%$. The house was destroyed, and my loss was $1245. Find the value of the house.

5. A house valued at $9000 is insured for $\frac{2}{3}$ of its value at $\frac{3}{4}\%$. If it is destroyed, what will be the owner's loss?

6. It cost $157.50 to insure property for $\frac{6}{7}$ of its value at $1.25 a $100.

7. A building valued at $40000 is insured for $\frac{4}{5}$ of its value. The premium is $240.

8. For what sum must a merchant have his store insured at 2% to cover a loss of $14700?

9. A store worth $8500 is insured at $1\frac{1}{2}\%$ for $\frac{3}{5}$ of its value.

10. A man paid $136 for an insurance on 40000 bushels of wheat, insuring it for $27200, or $\frac{4}{5}$ of its value.

11. A cargo of flour was insured for $\frac{4}{5}$ of its value at $1.50 a $100. The premium was $270.

LESSON 10.

1. A merchant has a stock of goods worth $12245. He insures them at $1\frac{1}{4}\%$ so that, in case of their destruction, he will lose nothing.

2. An elevator is valued at $24000. The owner insures it for $\frac{5}{6}$ of its value at $\frac{3}{4}\%$, and the grain in it for $25000, or $\frac{5}{6}$ of its value, at $\frac{1}{2}\%$.

3. A man insures 750 barrels of flour for ⅔ of its value at 2½%, paying a premium of $50.

4. A speculator bought 50000 pounds of wool and insured it for $12800, which was ⅘ of its value, paying a premium of $96.

5. For what sum must a house valued at $5200 be insured at 2½% to cover ¾ of its value?

6. A merchant had 2400 barrels of flour worth $4 a barrel. He insured it for ¾ of its value at 1¼%. A fire occurring, he saved 500 barrels. Find his loss.

7. A man paid $400 to have his factory insured for $32000, which was ⅔ of its value.

8. A insured a stock of wool for ⅞ of its value at 2%. The wool was destroyed, and he lost $2280. Find the value of the wool.

9. Goods were insured for ¾ of their value at 1¼%. The premium paid was $157.50.

10. My store worth $8000 and goods worth $5500 were insured, the former for ¾ of its value at $1.25 a $100, and the latter for ⅘ of their value at 1½%. A fire occurring, I saved $1500 worth of the goods. What was my loss?

LESSON 11.

1. Forty carriages were insured for $4200, which was ¾ of their value. The premium was $31.50.

2. A man paid $315 for insuring his store and goods for ⅞ of their value at 1½%. The goods were worth twice as much as the store.

3. A man saved $10638 by having 45000 pounds of wool insured for ⅘ of its value at 1½%.

4. A factory cost $21000. It is insured for ⁶⁄₇ of its value at two per cent. The machinery is insured at 1% for $8000, or ⅘ of its value.

5. A merchant insured his store and goods for ⅚ of their value at 1¾%, paying a premium of $271.25. The store was worth one-half as much as the goods.

6. A merchant paid $112.50 for insuring his store for $7500, and $108 for insuring his goods for $13500, insuring the former for its full value and the latter for ¾ of their value.

7. For what sum must a stock of goods valued at $56000 be insured at 2% to cover ⅞ of their value?

8. My stock of flour worth $12600 was insured for ⅚ of its value at 1¼%. A fire occurring, I saved 500 barrels worth $4 a barrel. What was my loss?

9. A's house was insured for ⅘ of its value at ¾%. The premium paid was $33.

10. A man insured 25000 pounds of wool for $7000, which was ⅔ of its value. The premium was $56.

LESSON 12. 1. Learn 173 . . . 183.

2. A man invested $12000 in business. He lost 12½% of it the first year and 9% of the remainder the second year. How much had he left?

3. From a cask containing 50 gallons of oil, three gallons less than one-half was sold. What per cent of the oil remained?

4. A earns 18% more in a week than B, and the sum of their wages is $54.50. How much does each earn?

5. A man paid 12⅘% of his month's wages for a coat that cost $16. How much does he earn a month?

6. A man bought a horse and carriage for $585, paying 44% less for the carriage than he paid for the horse.

7. A man received an annual income of $6500 for three years. He spent 34% of it the first year, 42% of it the second year, and 54% of it the third year.

8. My stock of goods cost $12425, which was 42% more than the cost of my store.

9. If 315 bushels of corn, 255 bushels of rye, and 180 bushels of oats are mixed together, what per cent of the mixture is each?

10. After a man had spent 38% of his month's salary, he had $77.50 left.

11. A man worth $110000 gave 16% of his property to his son, and this was equal to 55% of what the son already had. How much has he now?

LESSON 13. 1. Learn 179 . . . 184.

2. A section of land that cost $3520 was sold at a loss of 35%. How much was received for it per acre?

3. A merchant sold some goods for $800 and gained twice as much as he would have lost, had he sold them for $537.50. Find the gain.

4. A man sold a farm at a loss of $468, thereby losing 3¼%. Find the cost.

5. A speculator made a profit of $730 on an acre of land that cost him $240.

6. A man made a profit of 115¾% on a farm sold for $8630. Find the gain.

7. A merchant has cloth for which he paid $4 a yard. It being slightly damaged, how much must he ask for it, that he may reduce the price 40% and yet lose only 10% on the cost?

8. A man bought a house for $4500, kept it four years at an annual expense of $125, and sold it at a profit of 16% on the entire cost.

9. There is a loss of $1.28 on two bushels of peanuts sold at five cents a pint.

10. A merchant averaged 15% profit on his sales. His losses by bad debts amounted to $1650. His net profit was $6000. Find the amount of his sales.

11. A merchant sold a stock of old goods at a loss of 12%, and with the money bought land, which he sold for $8910 and gained 125%.

LESSON 14. 1. Learn 179 . . . 184.

2. Cloth that cost $1.50 a yard was marked to be sold at $2; but before selling, the merchant reduced the price 12½%. Find the gain per cent.

3. A dealer bought a shipment of 5000 watermelons at 18 cents apiece. 500 were spoiled in shipment, and the remainder being damaged, he was obliged to sell them at a loss of 30%.

4. A man gained $900 on a house, which he sold for $6300. What was the gain per cent?

5. A speculator sold a house, on which he had expended $1200 in repairs, for $600 above the first cost and lost 15% on the whole cost.

6. I sold a piece of land so that $\frac{4}{5}$ of the profit equaled $\frac{3}{5}$ of the cost. Find the gain per cent.

7. A jeweler sold two gold watches at $91 apiece, gaining 30% on one and losing the same per cent on the other.

8. Five men invested equally in the purchase of a large tract of land. Three of them sold their interest for one-half of the whole cost. What per cent did they lose?

9. A merchant marked damaged goods, which cost him $198.75, so that he might reduce the first price 25% and still sell them at cost.

10. A sold a piece of land to B for $550, and B sold it to C at a profit of 250%.

11. A man sold a house for $4140 and lost the same amount that he would have gained by selling it for $4860.

LESSON 15.

1. Learn 173 . . . 184.

2. I sold real estate for 245% of the cost, or $9860 more than I paid for it.

3. A man owning a two-fifths interest in a manufacturing business, sold 40% of his share for $4080, which was 15% less than it cost him.

4. What per cent do I gain or lose, if I sell ⅞ of an acre of land for what the whole cost?

5. A man bought 1200 cattle at $40 a head. He sold 25% of them at a profit of 5%, 50% of them at 8% above cost, and the remainder at a loss of 2⅓%.

6. A butcher made a profit of $30 on 6 cwt. of beef, which he sold at 14 cents a pound.

7. A speculator sold a section of land at $10.80 an acre and gained 35%. He then sold another section at a loss of 14%, and lost the same amount that he gained on the first.

8. A man sold his house for 86½% of the cost and lost $631.80.

9. A man bought a horse for $400. What must he ask for the horse, so that he may abate 25% and still gain 50%?

10. A man bought property for $13600 and sold it so as to make 18¾%, after paying an agent $350 for selling.

11. By selling shoes at $3.80 a pair, a dealer lost $1.20.

LESSON 16.

1. Learn 185 . . . 191.

2. An agent purchased 8½ tons of raw sugar at 3½ cents a pound on 3% commission.

3. I received $1824 for a quarter-section of land, which an agent sold for me at $12 an acre.

4. I sent my agent $2500, which included a sum to be invested in flour at $4.75 a barrel, his commission of 5%, and $106 for freight.

5. A farmer paid a commission merchant $145.92 for selling 2560 bushels of potatoes on 6% commission.

6. A commission merchant sold 1200 pounds of butter at 30 cents a pound. He retained $30, which included his commission and $12 for other charges.

7. An agent sold grain at 42 cents a bushel, and after reserving his commission of $819 and $481 to pay other charges, he remitted to the consignor $26000.

8. The net proceeds of a sale of flour were $6500, the commission merchant reserving his commission of 2½% and $130 to pay freight.

9. I sent my agent a sum of money with which he bought for me on 4% commission 3000 barrels of flour at $4.30 a barrel, and had enough money left to pay the freight, amounting to $575.

10. A commission merchant remitted $249.60 from a sale of poultry, which he sold for $260.

TO THE TEACHER. — Teach 216 . . . 232.

LESSON 17. 1. Learn 216 . . . 232.

2. A broker takes his commission of 2½% out of a remittance of $14760 and invests the remainder in wheat at 80 cents a bushel.

3. An agent sold cattle at $45 a head on 5% commission. His commission was $371.25.

4. An agent sold a section of land at $12 an acre and received as his fee $326.40.

5. The net proceeds of a sale were $1368. The commission was $57.

6. An agent sold 560 yards of silk. After deducting his commission of 10% and $30 to pay other charges, he remitted to the consignor $600.

7. A commission merchant sold a consignment of cheese and invested the proceeds in sugar, deducting 4% commission each for buying and selling. He bought $240 worth of sugar.

8. A broker sold 180000 bushels of wheat at 95 cents a bushel. After taking out his commission and $580 for other charges, he remitted to the consignor $167000.

9. A brewer sent his agent $808.50 to invest in hops at 55 cents a pound, after taking out his commission of 5%.

10. I received $184.24 for selling a stock of goods on 2⅓% commission.

11. A commission merchant sold a consignment of potatoes for $7200 and retained $500, which included his commission and $140 for freight.

To the Teacher. — Teach 233 . . . 241.

LESSON 18.

1. Learn 216 . . . 241.

2. Find the interest of $480 for 3 yr. at 7%.

3. Find the amount of $750 for 18 da. at 6%.

4. Find the interest of $1465 from June 6, 1890, to July 6, 1895, at 7%.

5. Find the amount of $825.46 for 1 yr. 8 mo. 24 da. at 5%.

6. Find the interest of $3250 for 12 da. at 6½%.

7. Find the amount of $1264 for 4 yr. 6 mo. at 5%.

8. Find the interest of $575 from Jan. 4, 1889, to March 16, 1892, at 6%.

9. Find the amount of $950 for 5 mo. 13 da. at 8%.

10. Find the interest of $265 for 25 da. at 4%.

11. Find the amount of $484 from Oct. 12, 1890, to May 12, 1892, at 7½%.

12. Write a non-negotiable promissory note for $275, payable in one year. Have some member of the class the payee and yourself the maker.

LESSON 19. 1. Learn 216 . . . 241.

2. Find the interest of $875 for 2 yr. 3 mo. at 8%.

3. Find the amount of $308.75 for 2 yr. 2 mo. 14 da. at 6%.

4. Find the interest of $528.40 for 75 da. at 9%.

5. Find the interest of $796 from May 25, 1890, to Nov. 13, 1894, at 6%.

6. Find the amount of $473 for 1 mo. 7 da. at 5½%.

7. Find the interest of $684.50 for 5 yr. at 4%.

8. Find the amount of $1400 for 6 yr. 4 mo. at 3%.

9. Find the interest of $3486 for 93 da. at 6%.

10. Find the amount of $687.48 from Jan. 14, 1884, to Dec. 14, 1886, at 3%.

11. Find the interest of $900 for 3 yr. 4 mo. 8 da. at 4½%.

12. Write a negotiable promissory note for $176.75, payable in six months. Have some member of the class the maker and yourself the payee. Indorse it in full, making it payable to your teacher.

To the Teacher. — Give frequent drill during the remainder of the term on the oral exercises in interest following this term's work.

LESSON 20. 1. Learn 216 . . . 241.

2. Find the amount of $758 for 3 da. at 3½%.

3. Find the interest of $980 for 3 yr. 6 mo. at 4½%.

4. Find the amount of $580.48 from Nov. 12, 1881, to Jan. 18, 1887, at 6%.

5. Find the interest of $420 for 9 mo. 1 da. at 7%.

6. Find the amount of $342 for 63 da. at 5%.

7. Find the interest of $738 from Apr. 15, 1889, to Sept. 15, 1892, at 6½%.

8. Find the amount of $2864 for 2 yr. 4 mo. at 7%.

9. Find the interest of $1175 for 4 yr. 3 mo. 5 da. at 6%.

10. Find the amount of $1845 for 4 yr. 3 mo. at 5½%.

11. Find the interest of $4800 for 19 da. at 6%.

12. Write a non-negotiable note for $95, payable on demand. Have your teacher the payee and yourself the maker.

TO THE TEACHER. — Teach 242. Show that the usual method of computing interest for days is not exact, since it is computed on the basis of 360 days in a year.

LESSON 21. 1. Learn 216 . . . 242.

2. Find the interest of $387.84 from Sept. 18, 1890, to Apr. 3, 1892, at 8%.

3. Find the amount of $1865 for 7 mo. 27 da. at 4%.

4. Find the interest of $2450 for 5 yr. 6 mo. at 8%.

5. Find the interest of $836 for 27 da. at 7½%.

6. Find the amount of $1748 from July 14, 1874, to Apr. 14, 1879, at 6%.

7. Find the interest of $3867 for 1 yr. 6 mo. 2 da. at 9%.

8. Find the amount of $1242.70 for 6 yr. at $3\frac{1}{2}\%$.

9. Find the interest of $575 for 33 da. at $5\frac{1}{2}\%$.

10. Find the exact interest of $4200 from Jan. 12, 1891, to Sept. 18, 1891, at 7%.

11. Find the exact interest of $742 for 145 days of a common year at 6%.

12. Find the exact interest of $1800 from Nov. 8, 1889, to Apr. 12, 1893, at 5%.

13. Suppose that C. D. Henry buys a horse of E. R. Page to-day for $375, agreeing to pay for it in one year with interest. Write the negotiable note that should be given in this transaction. Indorse it in full.

TO THE TEACHER. — Teach 243 . . . 245.

LESSON 22. 1. Learn 242 . . . 245.

2. Find the interest of $428.40 from Aug. 26, 1888, to Dec. 5, 1890, at 3%.

3. Find the amount of $665.20 for 10 mo. 16 da. at 6%.

4. Find the interest of $8000 for 3 yr. 4 mo. at 5%.

5. Find the amount of $2700 for 15 da. at 6%.

6. Find the interest of $264.80 from March 16, 1867, to Nov. 16, 1872, at $4\frac{1}{2}\%$.

7. Find the amount of $586.15 for 3 yr. 11 mo. 6 da. at $3\frac{1}{2}\%$.

8. Find the interest of $475.82 for 4 yr. 3 mo. at 4%.

9. Find the exact interest of $28500 from Aug. 12, 1879, to June 15, 1880, at 7%.

10. Find the exact interest of $4000 from Nov. 18, 1888, to Aug. 24, 1892, at 5%.

11. A note for $4500, dated June 14, 1887, bearing 6% interest, payable annually, was paid June 14, 1892. Find the amount due on the note, if no interest had been paid.

12. Find the amount due on a note for $4000 with annual interest at 5%, dated Apr. 14, 1888, and paid Oct. 14, 1892.

TO THE TEACHER. — **Teach 246 and 247.**

LESSON 23. 1. Learn 242 . . . 247.

2. Find the interest of $947 for 26 da. at 7%.

3. Find the amount of $1214 from Oct. 4, 1887, to Feb. 28, 1891, at 6%.

4. Find the interest of $764.48 for 3 mo. 22 da. at 5%.

5. Find the amount of $6750 for 2 yr. 6 mo. at 3%.

6. Find the interest of $15000 for 93 da. at 6½%.

7. Find the amount of $8645 from Feb. 8, 1874, to Sept. 8, 1875, at 8%.

8. Find the exact interest of $2800 from July 12, 1886, to June 2, 1890, at 5%.

9. Find the amount of $875 from June 1, 1886, to Dec. 1, 1892, at 6% annual interest.

10. Find the amount of $4000 for 3 yr. at 5% compound interest.

11. Find the amount of $5000 from Apr. 1, 1884, to Nov. 25, 1890, at 5% annual interest.

12. Find the amount of $2000 for 2 yr. at 8% compound interest, interest compounded semi-annually.

13. Write a negotiable promissory note for $195.93, payable in 90 days. Have some member of the class the payee and yourself the maker. Have it indorsed in full and made payable to some other member of the class.

LESSON 24. 1. Learn 242 . . . 247.

2. Find the interest of $548 for 2 yr. 8 mo. 25 da. at 6%.

3. Find the amount of $448.25 for 5 yr. at 4½%.

4. Find the interest of $2650 for 93 da. at 6%.

5. Find the amount of $798 from Sept. 29, 1890, to Apr. 1, 1895, at 4%.

6. Find the interest of $3000 for 7 mo. 18 da. at 7½%.

7. Find the amount of $1700 for 6 yr. 4 mo. at 7%.

8. Find the interest of $672.47 for 63 da. at 6%.

9. Find the amount of $843 for 2 yr. 9 mo. 24 da. at 6%, interest compounded semi-annually.

10. Find the exact interest of $12400 from June 15, 1889, to Jan. 28, 1893, at 5%.

11. Find the compound interest of $700 for 3 yr. 7 mo. 18 da. at 6%, interest compounded annually.

12. Find the exact interest of $875 from Jan. 12, 1886, to Oct. 18, 1892, at 7%.

13. Find the amount of $1250 for 5 yr. 8 mo. 27 da. at 7% annual interest.

14. Suppose that A. B. Davis owes C. R. Stiles $284.75 and he gives a negotiable note, payable in six months with interest. Write the note that should be given.

TO THE TEACHER. — Teach 248 and 249.

LESSON 25. 1. Learn 248 and 249.

2. What sum of money will produce $212.16 interest in 3 yr. at 6% ?

3. What sum at 6% interest will amount to $1436.42 in 4 years ?

4. What principal will give $486 interest in 1 yr. 8 mo. 18 da. at 5% ?

5. What sum of money put at interest at 5% for 4 yr. 6 mo. will amount to $1868.28 ?

6. What sum must be invested at 7% to yield $4200 interest annually?

7. Find the principal that will amount to $742 in 6 mo. 18 da. at 6%.

8. What sum invested at 6% will produce a semiannual income of $1575?

9. Find the principal that will amount to $428.12 in 138 days at 6%.

10. Find the principal that will produce $742 interest in 9 mo. 22 da. at 6%.

11. What sum at 6% interest will amount to $1637.86 in 2 yr. 9 mo. 15 da.?

12. Write a non-negotiable promissory note for $285, payable in 60 days. Have some member of the class the payee and yourself the maker.

TO THE TEACHER. — Teach 250 and 251.

LESSON 26.

1. Learn 248 . . . 251.

2. At what rate per annum will $7500 produce $450 interest in 1 yr. 6 mo.?

3. Find the rate per annum when the amount of $1275 for 2 yr. 7 mo. 6 da. is $1440.75.

4. In what time will $750 give $58.46 interest at 6%?

5. In what time will $1200 amount to $1246.28 at 5%?

6. What sum must be invested at 5½% to produce a quarterly income of $4125?

7. If I pay $63.50 for the use of $1500 for 8 mo. 14 da., what is the rate per annum?

8. In what time will $486 produce $18.75 interest at 6%?

9. What sum of money put at interest at 5% for 2 yr. 5 mo. 13 da. will amount to $1376.49?

10. If I make a loan of $950 and at the end of 2 yr. 4 mo. 24 da. receive $1109.60, what is the rate per annum?

11. In what time will $840 amount to $1275 at 5½%?

12. Suppose you owe some member of your class $75.75 and give him a note payable in one year with interest. Write the note and have it indorsed in full.

LESSON 27. 1. Learn 248 . . . 251.

2. What principal will produce $248.63 interest in 7 mo. 12 da. at 5%?

3. What sum of money put at interest at 6% for 10 mo. 11 da. will amount to $236.92?

4. If $1265 produces $290.95 interest in 4 yr. 7 mo. 6 da., what is the rate per annum?

5. Find the principal that will produce $1642 interest in 4 yr. 5 mo. 10 da. at 7%.

6. How long will it take $950 to yield $216.42 interest at 7%?

7. Find the principal that will amount to $1426.74 in 2 yr. 3 mo. 27 da. at 5%.

8. What sum must be invested at 4% to give a semi-annual income of $2350?

9. What sum at 4½% interest will amount to $968 in 192 days?

10. At what rate per annum will any sum of money double itself in 16 yr. 8 mo.?

11. In what time will $1500 amount to $1528.60 at 6%?

12. Suppose C. W. Mason owes J. F. Kent $59.67 and gives him a negotiable promissory note, payable in 90 days. [illegible] the note and indorse it properly.

LESSON 28. 1. Learn 248 . . . 251.

2. In what time will $575 give $25.50 interest at 7% ?

3. At what rate per annum will $4000 amount to $4472 in 2 yr. 11 mo. 12 da. ?

4. What principal will produce $286 interest in 5 mo. 27 da. at 6% ?

5. What sum at 6% interest will amount to $578.84 in 7 mo. 19 da. ?

6. In what time will any sum of money double itself at 5% ? at 4% ? at 6% ?

7. If I pay $96.04 for the use of $840 for 1 yr. 7 mo. 18 da., what is the rate per annum ?

8. What sum must be invested at 5% to give $4268 interest in 5 yr. 10 mo. 18 da. ?

9. Find the principal that will amount to $1844.44 in 1 yr. 11 mo. 18 da. at 5%.

10. A note for $1400 is dated Apr. 1, 1888. How long must it run to amount to $1843.75 at 5% ?

11. Find the rate per annum when the interest of $1268 for 2 yr. 9 mo. 18 da. is $266.28.

12. Write a non-negotiable promissory note for $900, payable in one year with interest. Have some member of the class the maker and yourself the payee.

LESSON 29. 1. Learn 200 . . . 211.

2. If a note yields $728 interest in 1 yr. 8 mo. 5 da. at 6%, what is the face of the note ?

3. In what time will $840 amount to $900 at 8% ?

4. If $875 yields $126 interest in 3 yr. 7 mo. 6 da., what is the rate per annum ?

5. Find the principal that will amount to $1728 in 2 yr. 1 mo. 17 da. at 5%.

6. In what time will \$750 produce \$88.75 interest at 5%?

7. How much money must be invested at 5½% to yield a quarterly income of \$800?

8. If I make a loan of \$1800, and at the end of 3 yr. 7 mo. 24 da. receive \$2325.60, what is the rate per annum?

9. What sum of money put at interest at 7% for 4 yr. 11 mo. will amount to \$4268.75?

10. Prepare the table to be used in making the tax-roll when the tax to be raised is \$16475 and the total valuation of property on the assessment-roll is \$2975450.

11. Write a non-negotiable promissory note for \$98.64, payable on demand. Have some acquaintance the payee and yourself the maker.

LESSON 30. 1. Learn 173 . . . 199.

2. A man sold a farm, on which he had expended \$2000 in improvements, for \$3800 more than the first cost and gained 12% on the entire cost.

3. A dealer bought 1200 barrels of apples for \$2726. 3⅓% of them being unsalable, he sold the remainder so that he neither gained nor lost.

4. A man insured his house for ¾ of its value at ½% annually. After paying 4 annual premiums, the house was destroyed by fire and he lost \$3180.

5. An agent sent his employer \$242.50, it being the proceeds of a sale of goods. His commission was \$7.50.

6. A tailor sold a suit of clothes for \$34, losing 15%. He then sold another suit for \$56 and gained as much as he lost on the first suit.

7. A man bought two farms for \$16700, paying \$2672 more for the better one than he paid for the other. What per cent of the whole cost was the cost of each?

8. A manufacturer received $1160 for goods, which an agent sold for him on 5% commission. The agent also reserved $37 for other charges.

9. A speculator paid $4000 for some land and sold it for $12500. Find the gain per cent.

10. A lady bought two pair of shoes for $6.75, paying $45\frac{5}{11}\%$ more for one pair than she paid for the other.

LESSON 31. 1. Learn 173 . . . 199.

2. It cost $840 to insure a church for $\frac{4}{5}$ of its value at $1\frac{1}{2}\%$. Find the value of the church.

3. A manufacturer directed his agent to buy 30000 pounds of wool at 32 cents a pound and remitted a sufficient sum to cover the cost, including the agent's commission of 5%.

4. A man paid $12600 for wool and sold it at a loss of $8\frac{1}{3}\%$.

5. A man who owned 75% of a coal mine sold 48% of his share for $54000. Find the value of his share and the value of the mine.

6. A farmer received $1185 for his potatoes, which were sold on commission for $1250.

7. A merchant made a profit of $15 by selling 25 pair of shoes at $4.60 a pair.

8. My furniture cost $1560, which was 76% less than the cost of my house. Find the cost of both.

9. A house valued at $14400 and insured for $\frac{3}{4}$ of its value at $1.25 a $100 was destroyed by fire. What was the owner's loss ?

10. A druggist made a profit of $29.50 on drugs, which he bought for $25.

LESSON 32.

1. A man who owed $784 paid 18½% of it at one time and 25% of the remainder at another time.

2. An agent received a remittance of $1105 with which to buy cheese at 12½ cents a pound, after deducting his commission of 4%.

3. A man bought 80 barrels of apples for $100. He lost ⅕ of them and sold the remainder so as to gain 28% on the whole cost.

4. A man bought a store for $7500, and ⅕ of the cost of the store was equal to 7½% of the sum paid for a house. How much did both cost?

5. A man paid $36 to have his property insured for $4800, which was two-thirds of its value.

6. I paid a commission merchant $39.20 for selling produce on 4% commission.

7. Sold a carriage at a profit of 33⅓%, and with the money bought another, which I sold for $180 and lost 25%.

8. A man bought property, which increased in value 25% the first year and 32% of its increased value the second year, when it was worth $11220.

9. A merchant received $13775 for goods, which an agent sold for him. The commission was $725.

LESSON 33.

1. A man who owned ⅝ of a lot of lumber sold it for one-half the cost of the whole. Find the gain or loss per cent.

2. A board is 9 ft. long and 13½ in. wide. What per cent of each dimension is the other?

3. A man insured 3000 barrels of flour for ⅘ of its value at 1%. The flour was burned and he lost $3432.

4. An agent remitted to his employer $7600 from a sale of 18 lots. The agent retained his commission of 5% and $95 for other charges.

5. A grocer bought a hogshead of molasses at 40 cents a gallon. Eight gallons having leaked out, he sold the remainder at a profit of 40 per cent.

6. A man expended $2040 in repairs on his store, which was 15% less than $\frac{2}{7}$ of the cost.

7. A commission merchant sold 42 tubs of butter, each weighing 50 pounds, at 22 cents a pound. After deducting his commission of 5% for selling and $22.90 for freight, he invested the proceeds, less 4% commission, in oranges.

8. I lost $960 on 160 acres of land, which I sold at $34 an acre.

9. A man inherited $48000 from his father's estate. He invested 15% of it in land, 55% of the remainder in bonds, and the remainder in railroad stock.

LESSON 34. 1. Learn 216 . . . 247.

2. Find the interest of $4140 from July 12, 1892, to May 12, 1895, at 9%.

3. Find the amount of $1470 for 4 yr. 4 mo. 12 da. at 5½%.

4. Find the interest of $290.75 for 3 yr. 6 mo. at 5½%.

5. Find the amount of $398 for 63 da. at 3%.

6. Find the interest of $582 from Feb. 6, 1891, to March 3, 1896, at 6%.

7. Find the amount of $874 for 9 mo. 16 da. at 4½%.

8. Find the interest of $795.85 for 4 yr. at 8%.

9. Find the amount of $287 for 120 da. at 3½%.

10. Find the interest of $463.80 from Sept. 1, 1891, to Oct. 1, 1894, at 7%.

11. Find the exact interest of \$8000 from Nov. 15, 1886, to March 17, 1891, at 4%.

12. Find the amount of \$4000 for 5 yr. 3 mo. 18 da. at 6% annual interest.

13. Find the compound interest of \$740 for 1 yr. 9 mo. 12 da. at 6%, interest compounded semi-annually.

14. Find the exact interest of \$5400 from June 8, 1891, to May 1, 1892, at 5%.

15. Suppose that I. C. Moore owes C. W. Mason \$275 and gives him a negotiable note, payable in 9 months with interest. Write the note as it should be.

LESSON 35.

1. Find the interest of \$735 for 9 da. at 6%.

2. Find the interest of \$578.48 for 2 yr. 3 mo. at 3½%.

3. Find the amount of \$3465 for 1 yr. 5 mo. 15 da. at 6%.

4. Find the amount of \$900 from Apr. 26, 1892, to May 2, 1893, at 5%.

5. Find the interest of \$350 for 2 mo. 9 da. at 6½%.

6. Find the amount of \$1234 for 5 yr. 4 mo. at 5%.

7. Find the interest of \$800 for 33 da. at 8%.

8. Find the amount of \$673.15 from May 5, 1891, to Apr. 5, 1896, at 6%.

9. Find the interest of \$2000 for 3 yr. 3 mo. 3 da. at 4%.

10. Find the exact interest of \$785 from Jan. 12, 1896, to Dec. 12 of the same year, at 5%.

11. Find the amount of \$1400 for 3 yr. 8 mo. 18 da. at 6%, interest compounded annually.

12. Find the exact interest of $1800 from Jan. 4, 1887, to Sept. 28, 1891, at 4%.

13. Find the amount of $6000 for 4 yr. 7 mo. 18 da. at 6% annual interest.

14. Write a negotiable note for $236, payable in 60 days with interest. Have some member of the class the maker and yourself the payee. Indorse it and make it payable to your teacher.

LESSON 36.

1. Find the interest of $500 for 4 da. at 7½%.

2. Find the amount of $4250 for 6 yr. at 4%.

3. Find the interest of $974 from Nov. 18, 1893, to March 3, 1896, at 9%.

4. Find the amount of $1750 for 5 mo. 20 da. at 6%.

5. Find the interest of $3842 for 3 yr. 6 mo. at 3%.

6. Find the amount of $335 for 63 da. at 6%.

7. Find the interest of $718 from Feb. 8, 1889, to Nov. 8, 1894, at 5½%.

8. Find the amount of $228.40 for 2 yr. 7 mo. 4 da. at 3%.

9. Find the exact interest of $7000 from Sept. 12, 1891, to June 18 of the next year, at 5%.

10. Find the amount of $5400 for 5 yr. 5 mo. at 7% annual interest.

11. Find the exact interest of $4200 from Sept. 8, 1879, to March 15, 1891, at 6%.

12. Write a non-negotiable promissory note for $85.93, payable in one year with interest. Have some acquaintance the payee and yourself the maker.

LESSON 37. 1. Learn 248 . . . 251.

2. In what time will $4000 amount to $5000 at 4½% ?

3. Find the rate per annum when the interest of $1576 for 1 yr. 5 mo. 18 da. is $173.36.

4. What principal will give $460.75 interest in 2 yr. 7 mo. at 5% ?

5. Find the principal that will amount to $1427.21 in 4 yr. 1 mo. 4 da. at 5%.

6. If I make a loan of $1850 and at the end of 1 yr. 11 mo. 12 da. receive $1994.30, what is the rate per annum ?

7. In what time will any sum of money double itself at 5% ? at 7% ? at 3% ?

8. If I receive $2200 semi-annually from an investment at 5%, what is the sum invested ?

9. What sum at 7% will amount to $892.76 in 2 yr. 4 mo. 12 da. ?

10. In what time will $1000 give $38.65 interest at 5% ?

11. At what rate per annum will $1400 produce $315 interest in 3 yr. 9 mo. ?

LESSON 38. 1. Learn 248 . . . 251.

2. Find the principal that will produce $216 interest in 174 da. at 6%.

3. What sum must be invested at 4% to amount to $1844.65 in 222 days ?

4. If I pay $245.70 for the use of $945 for 3 yr. 5 mo. 18 da., what is the rate per annum ?

5. In what time will $1600 amount to $1672.81 at 6% ?

6. What sum must be invested at 7% to produce $875.46 interest in 2 yr. 3 mo. 17 da. ?

7. Find the principal that will amount to $843.82 in 8 yr. at 6%.

8. If $1200 amounts to $1391 in 2 yr. 7 mo. 25 da., what is the rate per annum?

9. In what time will $685 yield $122 interest at 4%?

10. How much must be invested at 4½% to give $1575 interest quarterly?

11. What sum of money put at interest at 7% for 3 yr. 7 mo. 28 da. will amount to $1734.28?

TO THE TEACHER. — Teach 252 . . . 255.

LESSON 39. 1. Learn 252 . . . 255.

2. A note for $1400, dated Jan. 1, 1887, was indorsed as follows: Feb. 8, 1888, $240; Jan. 1, 1889, $375; Nov. 7, 1889, $212. What was due June 15, 1890, with interest at 6%?

3. A note for $950, dated March 12, 1888, bearing interest at 7%, was indorsed as follows: Apr. 1, 1889, $175; March 12, 1890, $50; Jan. 1, 1891, $280. How much was due Apr. 1, 1892?

4. A note for $1600, dated Apr. 1, 1886, was indorsed as follows: Apr. 1, 1887, $75; Jan. 2, 1888, $425; Nov. 24, 1888, $345. Find the amount due on the note June 16, 1889, with interest at 5%.

5. Consider yourself the payee in each of these notes. Write the three notes and properly indorse the payments on them.

TO THE TEACHER. — Show pupils how to compute the approximate interest mentally to determine whether it is greater or less than the payment. This often saves much work in partial payments.

LESSON 40. 1. Learn 252 . . . 255.

2. A note for $1850, dated June 1, 1887, bearing interest at 6%, was indorsed as follows: Jan. 1, 1889, $150; Nov. 4, 1889, $475; June 1, 1890, $265; Apr. 12, 1891, $288. Find the amount due on the note June 1, 1892.

3. A mortgage for $4500, dated Apr. 1, 1885, was indorsed as follows: Apr. 1, 1886, $250; Nov. 8, 1886, $485; Apr. 4, 1887, $348; Jan. 1, 1889, $500. What was due on the mortgage Apr. 1, 1890, with interest at 5%?

4. A note for $1400, dated July 1, 1888, bearing interest at 7%, was indorsed as follows: Apr. 1, 1889, $270; Nov. 20, 1890, $100; Apr. 1, 1891, $368. Find the amount due on the note Nov. 1, 1892.

5. Consider yourself the maker and some other member of the class the payee in the second and fourth examples. Write the two notes and have the payments properly indorsed on them.

LESSON 41.

1. A note for $2200, dated June 4, 1887, was indorsed as follows: Apr. 12, 1888, $235; May 8, 1889, $72; Dec. 5, 1889, $385; March 2, 1891, $440. How much was due on the note Apr. 1, 1892, with interest at 5%?

2. A note for $800, dated Nov. 18, 1886, bearing interest at 6%, was indorsed as follows: June 12, 1887, $25; Apr. 1, 1888, $145; June 2, 1889, $175; Feb. 4, 1890, $95. Find the amount due on the note Nov. 18, 1891.

3. A note for $1850, dated May 7, 1888, was indorsed as follows: Apr. 7, 1889, $264; July 9, 1890, $125; Jan. 1, 1891, $426. How much was due on the note May 7, 1892, with interest at 7%?

4. Consider yourself the maker of these notes and some other member of the class the payee. Write the three notes and have the payee indorse the payments on them.

LESSON 42. 1. Learn 173 . . . 199.

2. A man insured a block of ten houses for $\frac{3}{4}$ of their value at $1\frac{1}{4}\%$, paying a premium of $600.

3. A man, wishing to sell his house, asked 30% more than it cost. He finally sold it for 15% less than his first price and gained $567. Find the cost.

4. A commission merchant sold 4500 pounds of butter at 32 cents a pound. After deducting his commission, $27.40 for freight, and $15 for storage, he remitted $1340.

5. A dealer sold 4400 barrels of flour at an average price of $4.32, losing $13\frac{3}{8}\%$ on one-fourth of it and gaining eight per cent on the remainder.

6. After paying $1680 on his house, a man still owes $2240 more than he paid. What per cent of the cost remains unpaid?

7. A man insured his store, valued at $7500, for $\frac{3}{4}$ of its value, and his goods for $14000, or $\frac{7}{8}$ of their value, both at $\frac{3}{4}\%$. A fire occurring, he saved $2800 worth of the goods. What was his loss?

8. A manufacturer sent his agent $8330, which included a sum to be invested in wool at 28 cents a pound, the agent's commission of 3%, and $110.60 for freight.

9. A carriage worth $175 was bought for $25 less, and sold for $14 more, than its real value.

10. My store cost $7540, which was 16% more than the cost of my goods. Find the cost of both.

LESSON 43.

1. A insured his buildings for $3600, which was $\frac{2}{3}$ of their value, paying a premium of $27.

2. A commission merchant received $49.98 for selling two car-loads of potatoes, each containing 490 bushels, on 6% commission.

3. A man bought land for $3400. He spent a sum equal to 25% of the cost of the land in improving it and sold it at a loss of 44%.

4. A lady spent 15% of her money for a dress, 22% for a cloak, 2% for a pair of shoes, and had $231.80 left.

5. A commission merchant sold 2400 pounds of cheese at 12 cents a pound. His commission was $11.52.

6. A dealer sold 75 barrels of flour for $427.50 and gained the same amount that he would have lost, had he sold it for $322.50.

7. A grocer sold tea and coffee for $183.30, receiving 44% less for the coffee than he received for the tea.

8. For what sum must a quantity of grain worth $66000 be insured at 1% to cover $\frac{3}{5}$ of its value?

9. The net proceeds of a sale of wheat, sold at 90 cents a bushel, were $10600, after the agent had deducted his commission of $162 and $38 for storage.

LESSON 44.

1. A sold a carriage to B at a loss of $8\frac{1}{3}$%, or $8 less than it cost. B sold it to C and gained 25%.

2. A man sold 35% of his crop of 5400 pounds of hops at 18 cents a pound and the remainder at 38 cents a pound.

3. The net proceeds of a sale of grain at 85 cents a bushel, after deducting a commission of $3\frac{1}{2}$% and $212 for other charges, were $6350.

4. If $\frac{5}{7}$ of the gain is equal to $\frac{2}{7}$ of the cost, what is the gain per cent?

5. A man built a house costing $4200, which was 180% more than $\frac{5}{6}$ of the cost of the lot. Find the cost of both.

6. A stock of goods worth $18600 was insured for ⅚ of the value at 2%. A fire occurring, the owner saved $2500 worth of goods. Find his loss.

7. A commission merchant received four car-loads of potatoes, each containing 650 bushels, which he sold at 60 cents a bushel on 6% commission.

8. A man who owned ⅗ of a factory sold 33⅓% of his share for $4340 and gained 8½%. Find the cost of the factory.

9. In a city of 48600 inhabitants, there are 7776 more females than males. What per cent of the whole population is each?

10. A merchant received $2576 as the proceeds of a sale of $2800 worth of goods.

LESSON 45. 1. Learn 200 . . . 215.

2. What is the duty, at 24% *ad valorem*, on an importation of $4750 worth of goods?

3. At 2½ cents a gallon, what is the duty on 165 hogsheads of molasses, each hogshead containing 60 gallons, allowing 4% for leakage?

4. At 12% *ad valorem*, what is the duty on 85 boxes of tin, 88 pounds in each box, invoiced at 8 cents a pound?

5. At 35% *ad valorem*, what is the duty on 500 dozen bottles of wine, invoiced at 35 cents a bottle, allowing 4% for breakage?

6. What is the duty, at 18% *ad valorem*, on 450 boxes of raisins, each box containing 36 pounds, invoiced at 12 cents a pound?

7. Prepare the table to be used in making the tax-roll when the tax to be raised is $7850 and the total valuation of property on the assessment-roll is $3245750.

LESSON 46. 1. Learn 216 . . . 247.

2. Find the interest of $375 for 2 yr. 3 mo. at 4½%.

3. Find the amount of $525 for 84 da. at 3½%.

4. Find the interest of $840 from June 21, 1892, to July 12, 1895, at 6%.

5. Find the amount of $700 for 11 mo. 21 da. at 4½%.

6. Find the interest of $468 for 4 yr. 4 mo. at 7%.

7. Find the amount of $745 from Jan. 4, 1893, to Sept. 4, 1894, a 6½%.

8. Find the interest of $922 for 4 yr. 6 mo. 10 da. at 6%.

9. Find the amount of $865.75 for 5 yr. at 5½%.

10. Find the exact interest of $12000 from Nov. 8, 1887, to June 15, 1888, at 5%.

11. Find the interest of $2500 from Apr. 10, 1892, to May 5, 1896, at 7%.

12. Find the exact interest of $5000 from June 18, 1887, to Jan. 4, 1893, at 6%.

13. Find the compound interest of $800 for 2 yr. 5 mo. 24 da. at 5%, interest compounded semi-annually.

14. Write a negotiable promissory note for $500, payable in 60 days with interest. Have it made payable to yourself. Indorse it in full, making it payable to your teacher.

LESSON 47.

1. Find the interest of $7000 for 93 da. at 7%.

2. Find the amount of $584 for 9 mo. 19 da. at 4%.

3. Find the interest of $925 for 6 yr. 6 mo. at 8%.

4. Find the amount of $6000 for 48 da. at 6%.

5. Find the interest of $486 from Nov. 7, 1881, to Apr. 7, 1884, at 6%.

6. Find the amount of $362.75 for 5 yr. 8 mo. 24 da. at 8%.

7. Find the interest of $2150 for 3 yr. 3 mo. at 3½%.

8. Find the interest of $876 for 63 da. at 9%.

9. Find the amount of $645 from Sept. 28, 1888, to Jan. 4, 1894, at 5½%.

10. Find the exact interest of $1800 from Oct. 18, 1891, to June 18, 1895, at 7%.

11. Find the amount of $400 for 4 yr. 7 mo. 24 da. at 6% annual interest.

12. Find the exact interest of $8000 from Jan. 1, 1892, to Dec. 1 of the same year, at 5%.

13. Suppose R. W. Tuttle owes T. W. Kays $185 and gives him a negotiable promissory note, payable in one year with interest. Write the note.

LESSON 48. 1. Learn 248 . . . 251.

2. Find the rate per annum when the interest of $800 for 3 yr. 6 mo. is $140.

3. How long will it take $2500 to earn $87.45 interest at 5% ?

4. How much must be invested at 7% to give a semi-annual income of $875 ?

5. What sum of money put at interest at 6% for 4 yr. 10 mo. 8 da. will amount to $1284.72 ?

6. If I pay $428.80 for the use of $1280 for 4 yr. 5 mo. 18 da., what is the rate per annum ?

7. In what time will $1250 amount to $1428 at 6% ?

8. What sum must be invested at 5½% to yield $648 interest in 2 yr. 9 mo. 17 da. ?

9. Find the principal that will amount to $962 in 246 days at 5%.

10. If I make a loan of $2500 and at the end of 2 yr. 10 mo. 6 da. receive $2785, what is the rate per annum?

11. In what time will any sum of money double itself at 4½% ? at 5½% ? at 6% ?

12. Write a negotiable promissory note for $95.75, payable in thirty days with interest. Have some member of the class the payee and yourself the maker.

LESSON 49.

1. Learn 252 . . . 255.

2. A mortgage for $5400, dated May 4, 1884, was indorsed as follows: June 2, 1885, $275; Jan. 1, 1886, $578; Dec. 22, 1886, $1250; June 12, 1887, $868. How much was due on the mortgage May 4, 1889, with interest at 6% ?

3. A note for $1750, dated Apr. 1, 1882, bearing interest at 5%, was indorsed as follows: Feb. 8, 1883, $245; Apr. 18, 1884, $50; Dec. 4, 1884, $362; Apr. 1, 1885, $475. How much was due on the note Apr. 1, 1886?

4. A note for $750, dated Nov. 8, 1883, was indorsed as follows: Apr. 2, 1884, $75; May 7, 1885, $35; Dec. 12, 1885, $128; Apr. 1, 1886, $240. Find the amount due on the note Nov. 8, 1888, with interest at 8%.

5. Consider yourself the maker of the notes in the third and fourth examples and some other member of the class the payee. Write the two notes and have the payments indorsed on them by the payee.

LESSON 50.

1. A note for $2800, dated Aug. 9, 1887, bearing interest at 4%, was indorsed as follows: Sept. 12, 1888, $225; Dec. 18, 1889, $75; Apr. 16, 1890, $348; Aug. 9, 1891, $295. Find the amount due on the note Aug. 9, 1892.

2. A note for $1300, dated Oct. 14, 1885, was indorsed as follows: Apr. 1, 1887, $250; June 8, 1888, $50; Jan. 1, 1889, $315; Dec. 4, 1889, $262. How much was due on the note Oct. 14, 1890, with interest at 7% ?

3. A note for $3200, dated Jan. 1, 1882, bearing interest at 6%, was indorsed as follows: Apr. 1, 1883, $195; Jan. 1, 1884, $400; Feb. 7, 1885, $548; Dec. 22, 1885, $320. What was the amount due on the note Jan. 1, 1887?

4. Consider yourself the payee in these notes and some other member of the class the maker. Write the notes and indorse the payments on them.

To the Teacher. — Teach 256 . . . 259.

ORAL EXERCISES IN INTEREST.

To the Teacher. — In this work impress upon the pupils that at 5%, the interest is $5 for every $100, $50 for every $1000; at 6%, the interest is $6 for every $100, $60 for every $1000; at 4½%, the interest is $4.50 for every $100, $45 for every $1000, etc. Require pupils simply to give the interest of the various sums for the given time at the given rate.

1. $100 at 4 % for 6 years.
2. $400 at 5 % for 4 years 6 months.
3. $250 at 6 % for 5 years.
4. $700 at 4½% for 2 years.
5. $150 at 7 % for 4 years.
6. $600 at 5½% for 3 years.
7. $1000 at 8 % for 3 months.
8. $300 at 6½% for 1 year.

9. $450 at 4 % for 6 months.
10. $2000 at 7½% for 4 months.
11. $800 at 4½% for 10 years.
12. $1500 at 5 % for 8 years.
13. $4000 at 6 % for 1 year 6 months.
14. $200 at 5½% for 7 years.
15. $900 at 7 % for 2 years.
16. $3000 at 6½% for 1 year.
17. $2500 at 8 % for 3 years 6 months.
18. $650 at 6 % for 4 months.
19. $100 at 7½% for 4 years.
20. $400 at 4½% for 6 months.
21. $250 at 5 % for 2 years.
22. $700 at 4 % for 3 months.
23. $150 at 8 % for 9 years.
24. $600 at 6½% for 1 year.
25. $1000 at 5½% for 3 years.
26. $300 at 7 % for 6 years.
27. $450 at 6 % for 4 months.
28. $2000 at 7½% for 2 years 6 months.
29. $800 at 5 % for 5 years.
30. $1500 at 4 % for 8 years.
31. $4000 at 4½% for 6 months.
32. $200 at 6½% for 7 years.
33. $900 at 8 % for 3 months.
34. $3000 at 5½% for 1 year.
35. $2500 at 7 % for 2 years.
36. $650 at 4 % for 1 year 6 months.
37. $100 at 6½% for 10 years.

38. $400 at 7½% for 2 years 6 months.
39. $250 at 6% for 4 years.
40. $700 at 5% for 2 years.
41. $150 at 7% for 6 months.
42. $600 at 4½% for 3 years.
43. $1000 at 7½% for 4 years 6 months.
44. $300 at 8% for 4 months.
45. $450 at 4% for 1 year 6 months.
46. $2000 at 5½% for 9 years.
47. $800 at 6% for 3 months.
48. $1500 at 8% for 2 years 6 months.
49. $4000 at 7% for 6 months.
50. $200 at 4½% for 3 years 6 months.
51. $900 at 5% for 2 years.
52. $3000 at 6% for 4 months.
53. $2500 at 4% for 4 years 6 months.
54. $650 at 8% for 1 year.
55. $100 at 4½% for 6 years.
56. $400 at 5½% for 1 year 6 months.
57. $250 at 5% for 3 years.
58. $700 at 6% for 2 years.
59. $150 at 4% for 7 years.
60. $600 at 6½% for 1 year.
61. $1000 at 4½% for 6 months.
62. $300 at 7% for 5 years.
63. $450 at 5% for 2 years.
64. $2000 at 6½% for 1 year.
65. $800 at 5½% for 3 months.
66. $1500 at 4% for 1 year 6 months.

67. $4000 at 7½% for 3 years 6 months.
68. $200 at 5½% for 8 years.
69. $900 at 7 % for 10 years.
70. $3000 at 8 % for 2 years.
71. $2500 at 6 % for 6 months.
72. $650 at 4 % for 4 months.
73. $100 at 6½% for 4 years.
74. $400 at 7½% for 5 years.
75. $250 at 6 % for 6 years.
76. $700 at 5 % for 3 years.
77. $150 at 8 % for 9 years.
78. $600 at 7 % for 1 year 6 months.
79. $1000 at 4½% for 2 years.
80. $300 at 4 % for 3 years 6 months.
81. $450 at 5 % for 1 year.
82. $2000 at 7½% for 2 years 6 months.
83. $800 at 6½% for 3 months.
84. $1500 at 10 % for 6 months.
85. $4000 at 4 % for 2 years.
86. $200 at 4½% for 7 years.
87. $900 at 6 % for 4 months.
88. $3000 at 3 % for 1 year 6 months.
89. $2500 at 8 % for 4 years 6 months.
90. $650 at 6 % for 1 year.
91. $100 at 5½% for 8 years.
92. $400 at 7 % for 3 months.
93. $250 at 4 % for 10 years.
94. $700 at 5 % for 2 years.
95. $150 at 10 % for 6 years.

96. $600 at 6½% for 4 months.

97. $1000 at 5½% for 3 years.

98. $300 at 3 % for 2 years 6 months.

99. $450 at 8 % for 3 months.

100. $2000 at 7½% for 6 months.

101. $800 at 9 % for 3 months.

102. $1500 at 3 % for 2 years.

103. $4000 at 2 % for 10 years.

104. $200 at 10 % for 9 years.

105. $900 at 5 % for 6 months.

106. $3000 at 4 % for 4 months.

107. $2500 at 6 % for 2 years.

108. $650 at 2 % for 3 years.

109. $500 at 4½% for 4 years.

110. $400 at 6 % for 3 years 6 months.

SEVENTH GRADE — THIRD TERM.

LESSON 1. 1. Learn 256 . . . 259.

2. What is the net amount of a bill of $1200, if a discount of 15% is allowed?

3. Find the net amount of a bill of $870, the discount being ⅙.

4. Find the net amount of a bill of $875, the discount being 20% and 5%.

5. What is received for a $1000 piano, if sold at a discount of 40% and 10%?

6. What is the net amount of a bill of $1400, the discount being ⅙ and 10%?

7. Which is better for the purchaser, and how much, a discount of 20% and 10%, or a discount of 30%, from a bill of $4650.50?

8. I paid $114.20 for books on which the bookseller allowed me 20% discount from the list price. Find the list price of the books.

9. A merchant sells a bill of goods, the list price of which is $840, at a discount of ¼ and 10%.

10. A bill of goods, at list price, amounted to $750. I paid $625 for them. What per cent discount was allowed?

11. What is the difference between a discount of 40% and 10%, and a discount of 30% and 20%, from a bill of $1675? Which is the better purchase?

LESSON 2. 1. Learn 256 . . . 259.

2. What is the cash value of a bill of goods amounting to $2215 at a discount of 20%, and 5% off for cash?

3. A merchant discounted a bill 5% for cash payment and received $1178. What deduction was made from the face of the bill?

4. Find the net amount of a bill of $685, the discount being ⅕ and 5% off for cash.

5. What is the difference between a discount of 45% and successive discounts of 25%, 15%, and 5%, from a bill of $2600? Which is the better sale?

6. What is the net amount of a bill of $600, the discounts being 30%, 10%, and 5%?

7. If a merchant allows a discount of 30% and 10% on a bill, what per cent of the bill does he receive?

8. A bookseller accepted $228 in payment of a bill of $342. What per cent discount did he allow?

9. How much will a discount of 25% and 5% reduce a bill of $2200?

10. At a discount of 15%, the net amount of a bill was $552.50. Find the face of the bill.

11. What per cent of a bill does a merchant receive, if he gives a discount of 20% and 5%?

To the Teacher.—Teach 260 . . . 265.

LESSON 3. 1. Learn 260 . . . 265.

2. What is the present worth of a debt of $685, due in 8 months without interest, if discounted at 6%?

3. A merchant buys goods for $1270 on 4 months' credit. If payment is made at the time of purchase, how much should be discounted, money being worth 9%?

4. What is the present worth of a debt of $4500, $2300 of which is due in 8 months, and the remainder in one year and two months without interest, if discounted at 6% ?

5. A dealer bought apples for $720 on two months' credit and sold them the same day for $785 cash. He then paid for the apples, discounting at 6%. How much did he gain?

6. How much will a man gain or lose by buying a house for $4400 cash and selling it the same day for $4800 on 8 months' credit, money being worth 6% ?

7. I owe $600 to be paid in 3 months, $500 to be paid in 4 months, and $800 to be paid in 6 months, all without interest. What is the present worth of the debt, discounting at 7% ?

8. What is the present worth of a debt of $1260, to be paid in 9 months with interest at 5%, if discounted at 8% ?

LESSON 4. 1. Learn 260 . . . 265.

2. What is the present worth of a debt of $6000, $\frac{1}{3}$ of which is due in six months, $\frac{1}{2}$ of the remainder in one year, and the remainder in one year and six months, all without interest, if discounted at 7% ?

3. I bought a quantity of sugar for $1675 cash and sold it the same day for $1825 on 3 months' credit. Find the gain or loss, discounting the bill at 8%.

4. If I buy a carriage for $340 on six months' credit, for how much cash must I sell it the same day to gain 20%, money being worth 7% ?

5. A merchant bought goods for $1650 on five months' credit. How much cash would have settled the account on the day of the purchase, discounting at 6% ?

6. Which is the more advantageous, to buy flour at $4.50 on four months' credit, or at $4.75 on six months' credit, money being worth 6% ?

7. A man bought lumber for $3200, ½ to be paid in 4 months and the remainder in eight months, all without interest. He sold the lumber the same day for $3500 cash and paid for it, discounting the bills at 6%.

8. What is the true discount on a debt of $580, payable in one year and four months without interest, money being worth 7% ?

LESSON 5. 1. Learn 256 . . . 265.

2. A offers his farm for $8500 cash or for $9000 payable in six months without interest. Which is the better purchase, discounting at 6% ?

3. A man bought a farm for $9000, payable as follows: ⅓ cash, 50% of the remainder in six months, and the remainder in one year without interest. To what cash purchase was it equivalent, money being worth 7% ?

4. A buys a house for $4800 and agrees to pay for it in one year without interest. If payment is made at the time of purchase, how much should be deducted, money being worth 7% ?

5. A owes me $1600. It is payable in four equal parts, in 2, 4, 6, and 8 months respectively, without interest. For how much cash should I settle to-day, money being worth 8% ?

6. Bought a span of horses for $750, agreeing to pay for them in nine months without interest. How much cash would have paid for them on the day of purchase, discounting at 8% ?

7. If a merchant buys flour for $675 on four months' credit, for how much cash must he sell it the same day to gain 12%, discounting at 8% ?

8. A holds two notes against B, one for $450 due Nov. 1, and the other for $500 due July 1, both without interest. Find the present worth of them April 1, discounting at 6%.

9. What is the present worth of a debt of $4800, ¼ of which is due now, $1500 due in 6 months, and the remainder in one year without interest, if discounted at 8% ?

10. Which is the more advantageous, to buy goods for $1480 on four months' credit, or for $1520 on six months' credit, discounting at 7% ?

LESSON 6.

1. A merchant bought goods for $4500, ⅓ to be paid in four months, ½ the remainder in 8 months, and the remainder in one year, all without interest. How much cash would have settled the account at the time of purchase, discounting at 9% ?

2. I can buy flour for $785 on four months' credit or for $750 cash. Which is the better purchase, money being worth 6% ?

3. I hold two notes against a man, one for $750 for one year, due Jan. 1, and the other for $800 for six months, due Aug. 1, both bearing interest at 5%. What is the present worth of them April 1, discounting at 8% ?

4. I owe A $2400. ¼ of it is due to-day, ½ of the remainder is due in four months without interest, and the remainder is due in one year with interest at 5%. What is the present worth of the debt to-day, discounting at 9% ?

5. Which is the more profitable, to buy a house for $4800 on six months' credit, or for $5000 payable in one year, money being worth 6% ?

6. What is the present worth of a debt of $2125 due in one year and eight months with interest at 4%, if discounted at 6% ?

7. If a speculator buys real estate for $16000 on six months' credit, for how much cash must he sell it the same day to gain 25%, money being worth 8% ?

8. A merchant bought goods for $1840 on 8 months' credit. After keeping the goods two months, he sold them for $2150 cash and paid the bill, discounting at 7%. Find his gain.

LESSON 7.

1. A merchant holds two notes against a customer, one for $125 for nine months, due Sept. 1, and the other for $275 for six months, due June 1, both bearing interest at 4 %. What is the present worth of them March 1, money being worth 7%?

2. Bought a piece of land for $2200 cash and sold it the same day for $2750 on six months' credit. How much did I gain or lose, discounting at 7% ?

3. How much should be discounted for the present payment of a debt of $876, ½ of which is due in 8 months and the remainder in one year, all without interest, money being worth 6%?

4. A can sell real estate for $18000 cash, or for $20000 payable ½ in six months and the remainder in one year without interest. If he accepts the latter offer, how much does he gain or lose, money being worth 6% ?

5. Bought wool for $980 on six months' credit. At the end of three months I sold the wool for cash at an advance of 20%, and paid the debt, discounting at 9%.

6. How much will I gain or lose by buying flour for \$1480 on 4 months' credit and selling it the same day for \$1520 cash, money being worth 6%?

7. A owes me \$300, which is due to-day, \$400 due in one year without interest, and \$500 due in two years with interest at 5%. For how much cash should I settle with him to-day, discounting at 7%?

8. A man buys flour for \$2840 on six months' credit. If payment is made at the time of purchase, how much should be deducted from the bill, money being worth 6%?

LESSON 8. 1. Learn 256 . . . 265.

2. A merchant was offered \$15000 cash for his stock of goods, or \$16500 to be paid in three equal parts, in six months, 9 months, and one year respectively, without interest. He accepted the latter offer. Did he gain or lose, money being worth 6%?

3. Bought a horse for \$350, payable in one year with interest at 6%. At the end of six months I sold the horse for \$500 cash, and paid the debt, discounting at 8%.

4. If A holds two notes against B, one for \$640 for four months, due Nov. 15, and the other for \$375 for three months, due Oct. 15, both bearing interest at 7%, what is the present worth of them Aug. 15, if discounted at 6%?

5. If a man buys land for \$2400 on three months' credit, for how much cash must he sell it the same day to gain \$1000, money being worth 6%?

6. What is the gain or loss on grain bought for \$14250 cash, and sold the same day for \$14500 on 6 months' credit, money being worth 7%?

7. A offers his house for sale for \$8500 cash, or for \$9250 payable in 9 months without interest. Which is the better purchase, money being worth 8%?

8. A man bought a house for $6000, ½ payable in one year and the remainder in two years, both with interest at 6%. At the end of nine months he sold the house for $8000 cash and paid the debt, discounting at 8%.

9. A dealer sold flour for $600, to be paid in equal parts, in 2, 4, and 6 months without interest. To what cash sale was it equivalent, money being worth 9%?

LESSON 9. 1. Learn 173 . . . 184.

2. What must be the price-mark on an article that cost $5, so that the merchant may abate 25% and still sell it at an advance of 20%?

3. A man engaging in business, lost 14% of his money the first year and 8% of the remainder the second year, when he had $11472.40 left.

4. A paid $36 for insuring his house and furniture for ⅘ of their cost at 75 cents a $100. The furniture cost ⅓ as much as the house.

5. A speculator bought ten lots at a uniform price, paying $22000 for them. He immediately sold them, gaining 30% on five of them and losing 22% on the others.

6. A man drew out 34½% of his deposit in the bank. Of that sum he spent $39.33, which was 9½% of what he drew out.

7. A shipper sent a grain broker $12950.60 to invest in wheat at 85 cents a bushel, after taking out his commission of 4%.

8. A man lost $1792 by selling a half-section of land at $10.40 an acre.

9. A man invested $30720 in 1280 acres of land, which pays him an annual income of 13% on the investment.

10. It cost $594 to have a church insured for $27000, which was ¾ of its value.

11. A man paid an agent $120.12 for selling 4576 bushels of corn on 3½% commission.

LESSON 10. **1.** Learn 185 . . . 199.

2. A man bought 120 yards of cloth for $210. ¼ of it was unsalable, but he sold the remainder so as to gain 20% on the whole cost.

3. A farmer raised 327 bushels of potatoes from 18 bushels of seed. What per cent of the seed was the increase?

4. A commission merchant sold 24000 pounds of wool at 30 cents a pound. He retained $400, which included his commission and $40 for freight.

5. A speculator sold a house for $9000 and lost 25%. For how much must he sell another at 16% profit, so that the gain may equal the loss on the first?

6. A tailor sold two suits of clothes for $87, receiving 26% less for one suit than he received for the other.

7. I insured my store for ⅘ of its value at 1% annually. After paying 5 annual premiums, the store was destroyed by fire and I lost $3600.

8. A commission merchant remitted $230 to a consignor from a sale of 850 pounds of butter, after deducting his commission of $12.75 and $12.25 for other charges.

9. A dealer bought 220 long tons of coal at $4.48 a ton and sold it at $5.25 a short ton.

10. Insured my house for $9000, its full value, and my furniture for $1800, ¾ of its value, both at one per cent. A fire occurring, I saved $800 worth of the furniture.

11. A commission merchant sold beans at $2.25 a bushel. He retained his commission of 5% and $22 for freight, and remitted to the consignor $320.

LESSON 11.

1. A sold a carriage to B for $250, and B sold it to C at a loss of 42%.

2. After a farmer had sold 7434 bushels of wheat, he had 16% of his crop left. How many bushels had he left?

3. A merchant sent to his agent enough money to buy 2500 barrels of flour at $4.75 a barrel and pay the agent a commission of 3%.

4. A speculator sold two tons of wool at 32 cents a pound and received $80 more than he paid for it.

5. A lady paid $36 for a dress, which was 85% less than she paid for a cloak.

6. Three thousand barrels of flour were insured for $10800, which was ⅘ of its value. The premium was $81.

7. A man bought a house and expended $7000 on it in repairs and improvements. He then sold it for $3590 more than the first cost and lost 15½% of the whole cost.

8. A man having $6400 in a bank, drew out 15% of it, then 35% of the remainder, and afterward deposited a sum equal to 125% of what he had drawn out.

9. A man insured 120000 bushels of wheat for ⅘ of its value at ¾%. The wheat was burned, and the owner's loss was $21012.

10. An agent remitted to a consignor $529 as the net proceeds of a sale of 4800 pounds of cheese, which he sold at 12 cents a pound. Besides his commission, the agent reserved $12.20 for freight and $6 for storage.

LESSON 12.

1. A man sold 160 acres of land for $6480, which was 10% less than he asked for it, but 25% more than he paid for it.

2. A man bought property which increased in value $12\frac{1}{2}\%$ the first year and 44% of its increased value the second year, when it was worth $64800.

3. An agent received $2106 to expend in buying sheep at $4.50 a head, after taking out his commission of 4%.

4. What per cent is gained or lost when an article is sold for $\frac{3}{4}$ of the cost? $\frac{8}{7}$? $\frac{7}{8}$? $\frac{4}{3}$? $\frac{5}{8}$? $\frac{11}{8}$? $\frac{3}{5}$? $\frac{5}{3}$?

5. A man bequeathed his property as follows: $70000 to his wife, $32000 to each of his three children, and $34000 to a college. What per cent of the estate did each receive?

6. An invoice of 4800 yards of silk was insured for $\frac{5}{6}$ of its value at $3\frac{1}{2}\%$. The premium was $175.

7. A man bought 240 sheep at $4.50 a head. He kept some of them and sold the remainder at a gain of 40% and received $180 more than they all cost.

8. A man sold real estate and deposited 84% of the money in a bank. He afterward drew out 6% of the sum deposited, when he had $13818 remaining in the bank.

9. A man bought a horse for $377, which was his commission at 4% on the sale of a farm, sold at $65 an acre.

10. A man bought 160 acres of land at $40 an acre. He expended thirty per cent of the cost of the land for buildings, and sold the property at a net profit of 25%.

LESSON 13. 1. Learn 216 . . . 241.

2. Find the interest of $537 for 4 mo. 2 da. at 6%.

3. Find the amount of $4350 for 2 yr. 4 mo. at 5%.

4. Find the interest of $976 for 33 days at 6%.

5. Find the amount of $784.45 from Jan. 5, 1884, to Aug. 5, 1887, at 3%.

6. Find the interest of $837 for 2 yr. 1 da. at $3\frac{1}{2}\%$.

7. Find the amount of $468.45 for 4 years at 4½%.

8. Find the interest of $1800 for 11 days at 7%.

9. Find the amount of $900 from Aug. 29, 1892, to Sept. 2, 1893, at 6%.

10. Find the interest of $635.87 for 2 mo. 28 da. at 4½%.

11. Find the exact interest of $6500 from March 4, 1891, to April 29, 1893, at 5%.

12. Find the amount of $3500 for 2 yr. 5 mo. 24 da. at 6% compound interest, interest compounded semi-annually.

13. Find the exact interest of $8400 from June 4, 1892, to April 16, 1893, at 7%.

14. Write a negotiable note for $575, payable in 90 days. Have some member of the class the payee and yourself the maker. Have it indorsed in full and made payable to some other member of the class.

LESSON 14. 1. Learn 216 . . . 241.

2. Find the interest of $540.70 for 7 yr. 4 mo. at 3%.

3. Find the amount of $328 for 12 days at 5%.

4. Find the interest of $750 from Sept. 8, 1890, to Aug. 8, 1895, at 6½%.

5. Find the amount of $627 for 2 yr. 3 mo. 18 da. at 6%.

6. Find the exact interest of $2500 from Jan. 1, 1890, to Nov. 28, 1893, at 5%.

7. Find the interest of $875.50 for 6 years at 7½%.

8. Find the amount of $4000 for 2 days at 6%.

9. Find the interest of $285 from Nov. 29, 1891, to April 1, 1894, at 8%.

10. Find the amount of $1375 for 8 mo. 23 da. at 4%.

11. Find the exact interest of $1450 from July 3, 1891, to May 18, 1894, at 7%.

12. Find the amount of $1800 for 3 yr. 7 mo. 24 da. with annual interest at 6%.

13. Write a negotiable promissory note for $375.25, payable in one year. Have some member of the class the maker and yourself the payee. Indorse it in full, making it payable to your teacher.

To the Teacher. — Teach 266 . . . 275.

LESSON 15. 1. Learn 266 . . . 275, also 232 . . . 235.

	DATE.	FACE.	PROCEEDS.	TIME.	DIS.	RATE.
2.	May 6	$235	?	30 da.	at date	6%.
3.	Jan. 15	?	$1185.30	60 da.	at date	7%.
4.	Nov. 4	$442	?	90 da.	at date	8%.
5.	Apr. 24	?	$500	60 da.	at date	6%.
6.	Sept. 10	$876	?	3 mo.	Nov. 13	6%.

7. Find the bank discount and proceeds of a note for $475, payable in 90 days, if discounted at date at 7%.

8. Find the bank discount and proceeds of a note for $810, payable in 60 days with interest at 5%, if discounted at date at 6%.

9. For what sum must a note be drawn for 30 days so that if discounted at date at 6%, the proceeds may be $450?

10. A merchant sold a bill of goods for $275 and received in payment a note for that sum, payable in 60 days without interest, which he had discounted the same day at a bank at 7%. Find the sum received for the goods.

11. Write a bank-note for $350, payable in 60 days to yourself. Indorse it.

LESSON 16. 1. Learn 266 . . . 275.

	DATE.	FACE.	PROCEEDS.	TIME.	DIS.	RATE.
2.	May 21	?	$347.55	90 da.	July 17	7%.
3.	Feb. 2	$1260	?	60 da.	Mar. 10	6%.
4.	July 5	?	$960	30 da.	at date	6%.
5.	Mar. 14	$ 700	?	90 da.	at date	8%.
6.	Nov. 20	?	$520	90 da.	Dec. 11	7%.

7. What must be the face of a note, so that if discounted at a bank for 60 days at 6%, the proceeds may be $160?

8. A gave a bank-note for 90 days to pay a bill of $342. What was the face of the note, if discounted at 6%?

9. Find the bank discount and proceeds of a note for $225, dated June 18, payable in 90 days, if discounted June 27 at 6%.

10. Find the bank discount and proceeds of a note for $1175, dated Jan. 14, payable in 90 days, bearing interest at 7%, if discounted Feb. 4 at 6%.

11. For what sum must a bank-note be drawn for 60 days to obtain $600 at a bank, if discounted at 6%?

12. Write a bank-note for $85.45, payable in 30 days to some member of the class. Have it indorsed.

LESSON 17. 1. Learn 266 . . . 275.

	DATE.	FACE.	PROCEEDS.	TIME.	DIS.	RATE.
2.	Aug. 8	$1060	?	4 mo.	Nov. 5	6%.
3.	Apr. 16	?	$340	60 da.	May 13	5%.
4.	Jan. 17	$ 550	?	90 da.	Mar. 2	6%.
5.	Feb. 4	?	$800	6 mo.	June 2	6%.

6. For what sum must a note be drawn for 90 days, dated Jan. 15, 1880, so that if discounted Feb. 5, 1880, at 7%, the proceeds may be $1232.50?

7. A man sold 450 sheep at $4.50 a head and took in payment a note for the amount, dated Apr. 22, payable in 60 days without interest, which he had discounted at a bank May 1 at 7%. Find the proceeds of the note.

8. A owes B $346. B accepts in payment a bank-note for 30 days to be discounted at 9%. What should be the face of the note?

9. A note for $640, dated Sept. 14, payable in 3 months, was discounted at a bank Oct. 14 at 6%. Find the proceeds.

10. Find the bank discount and proceeds of a note for $850, payable in 60 days, if discounted at date at 8%.

11. Write a bank-note for $290, payable in four months to yourself. Indorse it.

LESSON 18. 1. Learn 266 . . . 275.

	DATE.	FACE.	PROCEEDS.	TIME.	DIS.	RATE.
2.	Sept. 16	?	$ 725.50	90 da.	Sept. 25	6%.
3.	Dec. 9	$ 630	?	60 da.	at date	7%.
4.	Oct. 12	?	$1465	3 mo.	Nov. 22	6%.
5.	July 24	$1240	?	90 da.	Aug. 20	8%.
6.	May 2	?	$ 633.28	90 da.	May 11	7%.

7. For what sum must a note be drawn for 90 days, so that if discounted 13 days after date at 12%, the proceeds will pay for 400 barrels of flour at $4 a barrel?

8. Find the bank discount and proceeds of a note for $480, payable in 90 days with interest at 7%, if discounted at date at 6%.

9. A man sold a span of horses and took in payment a note for $850, dated April 4, payable in three months without interest, which he had discounted the same day at a bank at 6%. How much did he receive for the horses?

10. A man gave a bank-note for 30 days to pay for a carriage that cost $275. What was the face of the note, if discounted at 6%?

11. Write a bank-note for $185, payable in 90 days to some member of the class. Have it indorsed.

LESSON 19. **1.** Learn 266 . . . 275.

	DATE.	FACE.	PROCEEDS.	TIME.	DIS.	RATE.
2.	Sept. 14	$488	?	3 mo.	Nov. 5	8%.
3.	Nov. 8	?	$1200	90 da.	at date	6%.
4.	Apr. 15	$765	?	30 da.	Apr. 18	6%.
5.	Jan. 4	?	$ 395.20	60 da.	Jan. 13	8%.
6.	Oct. 28	$510	?	4 mo.	at date	7%.

7. The proceeds of a note, discounted at a bank for 48 days at 6%, were $458. Find the face of the note.

8. For what sum must a note be drawn for 45 days to obtain $650 at a bank, if discounted at date at 8%?

9. Find the bank discount and proceeds of a note for $720, dated Feb. 12, payable in 60 days, if discounted Feb. 27 at 7%.

10. For what sum must a note be drawn for three months, dated June 16, so that if discounted July 15 at 6%, the proceeds may be $386?

11. Find the bank discount and proceeds of a note for $1275, payable in 90 days, if discounted at date at 6%.

12. Write a bank-note for $75.75, payable in 60 days to yourself. Indorse it.

LESSON 20.

1. Learn 266 . . . 275.

	DATE.	FACE.	PROCEEDS.	TIME.	DIS.	RATE.
2.	Mar. 17	?	$596.70	30 da.	at date	6%.
3.	Aug. 12	$1075	?	90 da.	Oct. 14	6%.
4.	Sept. 7	?	$827.40	3 mo.	Sept. 29	7%.
5.	May 18	$ 288	?	60 da.	June 2	8%.
6.	July 6	?	$542.30	4 mo.	Aug. 17	6%.

7. A merchant gave a bank-note for 60 days to pay the present worth of a bill of $575, due in 4 months without interest, discounting the bill at 10%. If the note was discounted at 6%, what was the face of the note?

8. A man sold a stock of goods and took in payment a note for $7250, payable in 90 days with interest at 6%, which he had discounted the same day at a bank at 7%. How much cash did he receive for the goods?

9. A man sold 25000 pounds of wool at 28 cents a pound and received in payment a note for the amount, dated June 22, payable in 90 days without interest, which he had discounted at a bank July 7 at 8%. Find the proceeds.

10. What must be the face of a note, so that if discounted at a bank for 72 days at 8%, the proceeds may be $945?

11. Write a bank-note for $195, payable in 30 days to some member of the class. Have it indorsed.

LESSON 21.

1. Learn 266 . . . 275.

	DATE.	FACE.	PROCEEDS.	TIME.	DIS.	RATE.
2.	Jan. 11	$ 975	?	30 da.	at date	7%.
3.	Dec. 22	?	$1386	90 da.	Jan. 24	6%.
4.	Feb. 19	$1146	?	9 mo.	Sept. 29	6%.
5.	Oct. 4	?	$ 543.95	30 da.	at date	7%.
6.	June 13	$ 120	?	60 da.	at date	8%.

7. A note for $720.50, dated Feb. 9, payable in three months, bearing interest at 5%, was discounted at a bank March 25 at 6%. Find the proceeds.

8. A gave a bank-note for 60 days to raise money to pay his note of $800 to B, which had been on interest nine months at 8%. Find the face of the note, if discounted at 6%.

9. I sold 450 barrels of flour at $3.75 a barrel and received in payment a note for the amount, payable in 90 days without interest, which I had discounted the same day at a bank at 8%. Find the proceeds of the note.

10. For what sum must a note be drawn for 90 days, dated Sept. 7, so that if discounted Oct. 22 at 9%, the proceeds may be $543.40?

11. Write a bank-note for $375, payable in 90 days to yourself. Indorse it.

LESSON 22.

1. Learn 266 . . . 275.

	DATE.	FACE.	PROCEEDS.	TIME.	DIS.	RATE.
2.	Apr. 14	?	$ 709.20	6 mo.	Aug. 18	9%.
3.	Nov. 23	$824	?	90 da.	Dec. 26	6%.
4.	Jan. 15	?	$ 675	45 da.	at date	7%.
5.	Mar. 29	$342	?	6 mo.	Aug. 9	6%.
6.	May 5	?	$4500	15 da.	at date	8%.

7. A merchant gave a bank-note for 30 days to pay another note of $1250, just maturing at the same bank. For what sum was the second note given?

8. Find the bank discount and proceeds of a note for $580.40, payable in three months with interest at 6%, if discounted at date at 8%.

9. The proceeds of a note, discounted at a bank for 54 days at 9%, were $164.48. Find the face of the note.

10. I sold some real estate and received in payment a note for $2850, dated Aug. 12, payable in four months without interest, which I had discounted at a bank Sept. 22 at 7%.

11. Owing a merchant $265, and not having the money to pay him, I gave him a bank-note for 60 days to be discounted at 8%. Find the face of the note.

LESSON 23. Lesson 27, seventh grade, second term.
" 24. Lesson 28, seventh grade, second term.
" 25. { Lesson 45, seventh grade, second term.
Lesson 1, seventh grade, third term.
" 26. Lesson 3, seventh grade, third term.
" 27. Lesson 4, seventh grade, third term.
" 28. Lesson 5, seventh grade, third term.

LESSON 29.

1. Learn 266 . . . 275.

	DATE.	FACE.	PROCEEDS.	TIME.	DIS.	RATE.
2.	Dec. 15	$ 695	?	90 da.	at date	7%.
3.	June 24	?	$ 597	4 mo.	Sept. 27	6%.
4.	July 2	$1450	?	60 da.	July 23	5%.
5.	Sept. 12	?	$ 742.85	90 da.	at date	6%.
6.	Apr. 18	$1675	?	6 mo.	Aug. 25	8%.
7.	Feb. 17	?	$6336	50 da.	Mar. 12	12%.

8. A man bought wool for $850 and sold it the same day, receiving in payment a note for $975, payable in 90 days without interest, which he had discounted at a bank at 7%. How much did he gain or lose?

9. Find the bank discount and proceeds of a note for $2400, dated to-day, payable in 4 months, if discounted to-day at 7%.

10. A merchant is offered $2500 worth of goods on four months' credit, or for the present worth of that sum in cash, discounting at 8%. He accepts the latter offer and obtains the money at a bank on a 90-day note. Find the face of the note, if discounted at 6%.

11. Write a bank-note for $275, payable in 60 days to some member of the class. Have it indorsed.

LESSON 30.

1. Learn 266 . . . 275.

2. Find the proceeds of a note for $985, dated March 8, payable in 60 days with interest at 4½%, if discounted March 29 at 7½%.

3. A merchant gave a bank-note for 90 days to raise money to pay his note for $1800, which had been on interest one year and six months at 7%. What was the face of the note, if discounted at 6%?

4. A man bought a piece of land for $950 and sold it the same day, receiving in payment a note for $1400, payable in sixty days with interest at 4%, which he had discounted that day at a bank at 7%. How much did he gain?

5. For what sum must a note be drawn for four months, dated Nov. 8, 1879, so that if discounted Jan. 17, 1880, at 8%, the proceeds may be $731.12?

6. A merchant wishes to get $1850 at a bank. For what sum must he give a note for 60 days, if discounted at 6%?

7. A man gave a bank-note for 90 days to pay the present worth of a debt of $285 due in 6 months without interest. Find the face of the note, discounting the debt at 8% and the note at 6%.

8. A man sold a horse and carriage and received in payment a note for $385, dated June 14, payable in 4 months with interest at 5%, which he had discounted at a bank July 31, at 7%. Find the proceeds of the note.

9. A builder offered a house for $5500 on 6 months' credit, or for the present worth of that sum in cash, discounting at 10%. The purchaser accepted the latter offer, and obtained the money at a bank on a 60-day note. Find the face of the note, if discounted at 7%.

10. Write a bank-note for $175.75, payable in 90 days to yourself. Indorse it.

LESSON 31.

1. Find the bank discount and proceeds of a note for $1500, payable in 60 days with interest at 8%, if discounted at date at 7%.

2. A note for $1625, dated Apr. 18, payable in six months without interest, was discounted at a bank July 17, at 7%. Find the proceeds.

3. Jan. 16, 1887, A gave B a note for $728, payable in one year with interest at 9%. July 16, 1888, B demanded settlement, and A gave him a bank-note for 60 days to be discounted at 7%. Find the face of the note.

4. A dealer bought flour for $6500 and sold it the same day at an advance of 10%, receiving in payment a note for the amount, payable in 90 days without interest, which he had discounted at a bank at 8%. Find his gain.

5. I had a 90-day note in a bank on which I had received $450 as the proceeds. Not having the money to pay it at maturity, I gave another note for 30 days. Find the face of the last note, discount in both cases being 6%.

6. A man gave a bank-note for 90 days to pay a 60-day note of $375, maturing on that day. Find the face of the note, if discounted at 6%.

7. A man sold land and took in payment a note for $8500, dated May 12, payable in six months without interest. Needing the money to use, he had the note discounted at a bank Sept. 10, at 8%. Find the proceeds.

8. A offers his stock of goods for $7800 on 6 months' credit, or for the present worth of that sum in cash, discounting at 8%. The buyer accepts the latter offer and gets the money at a bank on a 60-day note. What was the face of the note, if discounted at 7%?

9. Write a bank-note for $94, payable in 30 days to some member of the class. Have it indorsed.

TO THE TEACHER. — Teach 276 . . . 283.

LESSON 32. 1. Learn 276 . . . 283.

2. A dealer sold 420 barrels of flour at $3 a barrel and received in payment a note for the amount, payable in 90 days without interest, which he had discounted the same day at a bank at 8%. Find the proceeds.

3. Find the bank discount and proceeds of a note for $4240, payable in 60 days with interest at 5%, if discounted at date at 6%.

4. A man had a 60-day note in a bank on which he had received $275 as the proceeds. Not having the money to pay it at maturity, he gave another note for 90 days to be discounted at 7%. Find the face of both notes.

5. A note for $975, dated July 14, payable in four months without interest, was discounted at a bank Aug. 31, at 10%. Find the proceeds.

6. I owe a man \$460 to be paid in 8 months without interest. If I give him a bank-note for 90 days for the present worth of the debt, what should be the face of the note, if the debt is discounted at 12% and the bank-note at 6% ?

7. Find the bank discount and proceeds of a note for \$500, dated April 4, payable in three months without interest, if discounted May 7, at 6%.

8. A speculator bought hops for \$1225 and sold them the same day at an advance of 12%, receiving in payment a note for the amount, payable in 60 days without interest, which he had discounted at a bank at 6%. Find the proceeds.

9. A man had a 90-day note in a bank on which he had received \$370 as the proceeds. Not having the money to pay it at maturity, and the bank demanding the cash, he obtained the money at another bank on a note for 30 days. Find the face of each note, if discounted at 6%.

TO THE TEACHER. — Teach 284 . . . 289.

LESSON 33.

1. Learn 276 . . . 289.

2. Find the bank discount and proceeds of a note for \$5250, payable in 90 days with interest at 8%, if discounted 21 days after date at 7%.

3. A man gave a bank-note for 90 days to raise money to pay a debt of \$875, which had been on interest two years at 8%. Find the face of the note, if discounted at 6%.

4. I bought a house for \$4500 and sold it the same day, receiving in payment a note for \$5000, payable in six months without interest, which I had discounted at a bank at 7%. How much did I gain ?

5. I wish to obtain \$860 at a bank. For what sum must I give my note for 60 days to be discounted at 6% ?

6. A note for $1440, dated May 4, payable in four months with interest at 6%, was discounted at a bank July 9, at 10%. Find the proceeds.

7. A farmer sold sheep and accepted in payment a note for $642, payable in 90 days without interest. Needing the money to use, he had the note discounted the same day at a bank at 6%. How much did he receive for the sheep?

8. A note for $3160, dated June 24, payable in 90 days without interest, was discounted at a bank Sept. 1, at 6%. Find the proceeds.

9. A merchant had a 90-day note in a bank on which he had received $980 as the proceeds. Not having the money to pay it at maturity, and the bank refusing to extend it, he obtained the money at another bank on a note for 60 days. Find the face of both notes, discount in each case being 6%.

10. Write a bank-note for $250, payable in 60 days to yourself, and indorse it.

To the Teacher. — Teach 290 . . . 292.

LESSON 34. 1. Learn 276 . . . 292.

2. Find the cost of a sight draft for $1475, exchange being at 1% premium.

3. How much will a sight draft for $740 cost, exchange being at 1¼% discount?

4. How large a sight draft can be bought for $486, when exchange is ½% premium?

5. A manufacturer sent his agent $4000 with which to buy wool, remitting by sight draft, bought at ½% premium. Find the cost of the draft.

6. Find the face of a 30-day draft that can be bought for $4500, exchange ¾% discount and interest 6%.

7. When exchange is at ¾% premium and money is worth 7%, what will be the cost of a draft for $4200, payable 30 days after date?

8. An agent sold a house for $6000 on 5% commission and remitted the proceeds by sight draft at 1% discount. Find the face of the draft.

9. Find the face of a sight draft that can be bought for $1200, exchange being at 1¼% premium.

10. Find the cost of a draft for $1250, payable in 30 days, when exchange is at ½% premium and money is worth 8%.

11. Having $1450 due my employer, I am instructed to remit by draft, payable 30 days after date. What will be the face of the draft, discounting at 6%, if exchange is at ¾% premium?

12. Suppose you want to remit $500 by sight draft. Write the draft that you should send. Indorse it in full.

LESSON 35.

1. Learn 276 . . . 292.

2. A man sent his agent $5000 to be invested in farm loans, remitting by draft payable 60 days after date. If exchange was at ¾% discount and money was worth 7%, what was the cost of the draft?

3. How large a draft, payable 15 days after date, can be bought for $1800, when exchange is at ¼% premium and money is worth 6%?

4. Find the cost of a sight draft for $2450, exchange being at ½% discount.

5. If exchange is 1½% premium, what will be the cost of a sight draft for $835?

6. A commission merchant sold butter for $294 on 5% commission and remitted the proceeds by sight draft, exchange being at ¾% premium. Find the face of the draft.

7. A speculator wishes his agent to buy 250 head of cattle at $40 a head and remits the money to him by sight draft, bought at 1½% premium. Find the cost of the draft.

8. A man paid $478.50 for a sight draft, which he bought at 1¼% discount.

9. How large a draft, payable in 15 days, can be bought for $435, if exchange is at ½% discount and money is worth 8%?

10. How large a sight draft can be bought for $875 when exchange is at ¾% discount?

11. When exchange is ½% premium and money is worth 6%, what will be the cost of a draft for $6000, payable 60 days after date?

12. Suppose you owe George B. Hurd & Co. of New York $45 and they draw on you for the amount at sight. Write the draft in three different ways.

LESSON 36. 1. Learn 276 . . . 292.

2. Find the cost of a draft for $685, payable 60 days after date, exchange being at ¾% discount and interest at 7%.

3. My agent sold property for me for $14200, which he remitted to me by sight draft, bought at ½% discount. Find the face of the draft.

4. If exchange is ¼% discount and money is worth 7%, how large a draft at 30 days sight can be bought for $8000?

5. How much will a sight draft for $4500 cost, exchange being at ¾% premium?

6. Bought a sight draft at ½% premium, paying $1600 for it. What was the face of the draft?

7. A merchant ordered $5000 worth of goods from New York and remitted by sight draft. Find the cost of the draft, exchange being at ⅝% premium.

8. A lawyer in Albany has $2875 due a client in Buffalo. He is instructed to remit by draft, payable in 30 days. If exchange is at ¾% premium and money is worth 6%, how large a draft can he buy?

9. I paid $1475 for a draft at 30 days sight. Exchange was at ⅞% premium and discount was computed at 6%.

10. I sold a quantity of goods for $4600 on 4% commission and remitted the proceeds to the consignor by sight draft, bought at ⅝% premium. Find the face of the draft.

11. When exchange is at 1% discount, how much will a sight draft for $1725 cost?

12. Suppose a man in Kansas owes you $300 and he remits to you by sight draft on New York. Write the draft that you should receive.

LESSON 37. 1. Learn 276 . . . 292.

2. When exchange is at ⅞% discount and money is worth 8%, what will be the cost of a draft for $1675 payable in 30 days?

3. How large a draft, payable 60 days after date, can be bought for $2200, if exchange is at ½% discount and money is worth 8%?

4. Find the cost of a draft for $3500 payable 30 days after date, exchange being at ¼% premium and interest at 7%.

5. A man sends me $450 with which to buy sugar, remitting by sight draft, exchange at 1¾% premium. Find the cost of the draft.

6. Having $1725.50 due my employer, I am directed to remit by draft at 60 days. If exchange is at ¼% discount and money is worth 6%, what will be the face of the draft?

7. If exchange is at 1% premium and money is worth 8%, how large a draft at 60 days sight can be bought for $1275.75?

8. An agent sold wool for $1850 on 5% commission and remitted the proceeds by sight draft, bought at ¼% discount. What was the face of the draft?

9. If exchange is at ⅜% premium, what will be the cost of a sight draft for $2000?

10. A miller sent his agent $2800 with which to buy wheat, remitting by draft at 60 days sight. If exchange was at 1¼% discount and money was worth 7%, what was the cost of the draft?

11. Find the face of a sight draft that can be bought for $240.50, when exchange is at ⅞% discount.

12. Suppose a man in Chicago owes you $375. Write a draft, drawing on him at sight for the amount.

LESSON 38.

1. Learn 276 . . . 292.

2. When exchange is at 1% discount and money is worth 6%, what will be the cost of a draft for $2500 payable 90 days after date?

3. An agent has $4500 due his employer, which he is instructed to remit by draft at 12 days sight. If exchange is at 1% premium and money is worth 6%, how large a draft can he buy?

4. Find the cost of a sight draft for $5800, exchange being at ¼% premium.

5. If exchange is ¾% discount and money is worth 6%, how large a draft at 30 days can be bought for $2100?

6. A man sent $25000 by sight draft, which he bought at ⅝% discount. How much did it cost?

7. An agent sold $14500 worth of goods on 3% commission and remitted the proceeds by sight draft, bought at 1% premium. Find the face of the draft.

8. If exchange is at ⅞% premium and money is worth 8%, what will be the cost of a draft for $1420, payable 60 days after date?

9. Find the face of a 30-day draft that can be bought for $742, if exchange is at 1% discount and money is worth 6%.

10. I sent my agent money to buy 40000 pounds of wool at 28 cents a pound, remitting by draft at 30 days sight. If exchange was at ¼% premium and money was worth 7%, how much did the draft cost?

11. A commission merchant has $782.16 due a consignor, which he is instructed to remit by draft, payable 30 days after date. If exchange is at ¾% discount and money is worth 6%, what will be the face of the draft?

12. Suppose you owe a man in some distant place $195 and remit to him to-day by sight draft. Write the draft that you should send him.

LESSON 39.

1. Learn 173 . . . 199.

2. A widow received 58% of her husband's estate, the daughter 22%, and the son the remainder. If the widow received $28000 more than both the children, how much did each receive?

3. A man insured his buildings, valued at $9000, for ¾ of their value at ¾%, and his personal property for $4000, or ⅘ of its value, at ½%.

4. A real estate agent sold two farms for $7500 and $9600 respectively and received a commission of $855.

5. I sold goods for $272. The loss was three times as much as the gain would have been, if I had sold them for $336. Find the cost of the goods.

6. A man bequeathed his property, amounting to $450000, as follows: 30% to found a library, 40% of the remainder to his wife, and the remainder equally to his three sons.

7. A speculator received $10700 for cattle, which an agent sold for him at $40 a head. The agent's commission was $336, and the agent also paid the freight, which amounted to $164.

8. If A makes a profit of 44% by selling his horse at an advance of $110, for how much more must B sell his horse, costing the same amount, to gain 100%?

9. In 285 ounces of gold coin there are 256.5 ounces of gold and 14.25 ounces each of silver and copper. What per cent of the whole is each?

10. A grocer insured his goods for $9000, which was $\frac{6}{7}$ of their value, paying a premium of $112.50.

11. A farmer received $1197 for apples, which a commission merchant sold for him at $2.25 a barrel on 5% commission.

LESSON 40.

1. I sold a horse for $150 and lost 40%. I then sold another at an advance of 16⅔% and gained as much as I lost on the first.

2. My buildings cost $7150, which was 8⅓% more than the cost of my farm. Find the cost of both.

3. A commission merchant, who charges 5% both for selling and buying, receives $1500 worth of produce and $1977 in cash with instructions to sell the produce and to invest in flour at $5 a barrel.

4. If half of a stock of goods is sold for what $\frac{5}{8}$ of them cost, what is the gain or loss per cent?

5. A speculator insured 50000 bushels of wheat for $\frac{8}{9}$ of its value at $1\frac{1}{8}\%$ and paid a premium of \$450.

6. A merchant bought goods for \$2400. He sold one-fourth of them at a loss of 15%, and the remainder so as to make a net profit of $12\frac{1}{2}\%$ on the whole.

7. A owned a half-interest in a manufacturing business. He sold 24% of his share for \$9000. What was the value of the whole business?

8. A merchant saved \$17685 by having 6000 barrels of flour insured for $\frac{2}{3}$ of its value at $1\frac{3}{4}\%$. Find his loss.

9. A commission merchant sold 240 bushels of potatoes at 80 cents a bushel, 1400 pounds of butter at 28 cents a pound, and 2000 dozen eggs at 22 cents a dozen. After taking out his commission and \$42.80 for other charges, he remitted to the consignor \$930.

10. A druggist made a profit of \$2.80 on a gallon of brandy, which he sold at \$1.35 a pint.

LESSON 41. 1. Learn 173 . . . 199.

2. A man bought two horses for \$462, paying 32% less for one than he paid for the other. Find the cost of each.

3. A broker received \$34000 with which to purchase wheat at \$.94 a bushel, after reserving his commission of $2\frac{1}{2}\%$ and \$277.50 to pay freight.

4. A bought a horse and kept it three years at an annual expense of \$100. He then sold the horse for \$100 less than the first cost and lost 40% of the entire cost.

5. I received an annual salary of \$2500 for four years. I spent 42% of it the first year, 53% the second year, 58% the third year, and 62% the fourth year. How much did I save in the four years?

6. A merchant insured his store for $8000, or $\frac{4}{5}$ of its value, and his goods, valued at $18000, for $\frac{8}{9}$ of their value, both at $1\frac{1}{4}\%$. The store and goods were totally destroyed by fire. Find the owner's loss.

7. An agent received $576 for selling land at $18 an acre on 5% commission.

8. A man bought a patent for $15000 and sold it for $35000 more than he paid for it. Find the gain per cent.

9. A farmer expended $5580 in erecting buildings on his farm, and this sum was equal to 24% more than $\frac{3}{8}$ of the cost of the farm. Find the cost of the farm.

10. A commission merchant sold a quantity of flour for $8450. He retained $450, which included his commission and $27.50 for storage.

11. A drover sold 400 sheep at $4 a head and gained 60% on one-half of them and lost the same per cent on the others. Find the net gain or loss.

LESSON 42.

1. A man willed 40% of his property to his wife, 50% of the remainder to his son, 60 % of what still remained to his daughter, and the remainder, amounting to $90000, to a college. What was the share of each ?

2. A speculator paid $600 for insuring his elevator and 60000 bushels of wheat for $\frac{3}{4}$ of their value at $1\frac{1}{4}\%$. The elevator was worth $\frac{1}{3}$ as much as the wheat.

3. A man owning three-fourths of a mill sold his share for $\frac{5}{8}$ of the entire cost. Find the gain or loss per cent.

4. A man bought a store and house for $12500, paying $3500 less for the house than he paid for the store. What per cent of the whole cost was the cost of each ?

5. A merchant insured 2500 barrels of flour for \$8800, which was $\frac{4}{5}$ of its value. The premium was \$110.

6. An agent sold 850 barrels of flour, and after taking out his commission of \$119, he sent the consignor \$2856.

7. A man bought land at \$40 an acre. How much must he ask an acre so that he may abate $18\frac{3}{4}\%$ and yet sell it at a profit of $62\frac{1}{2}\%$?

8. A farmer lost 16% of his sheep and then sold 40% of the remainder, when he had 441 left. How many did he sell ?

9. A insured his mill for $\frac{7}{8}$ of its value at $1\frac{1}{2}\%$ annually. After paying 4 annual premiums, the mill was destroyed by fire and he lost \$4260. Find the sum insured.

10. After taking out his commission of 4% and \$40.40 for other charges, a commission merchant remitted to a farmer \$910, the amount due him on potatoes sold at \$.60 a bushel.

LESSON 43. Lesson 39, seventh grade, second term.
" 44. Lesson 40, seventh grade, second term.
" 45. Lesson 21, seventh grade, second term.
" 46. Lesson 29, seventh grade, second term.
" 47. Lesson 6, seventh grade, third term.
" 48. Lesson 15, seventh grade, third term.
" 49. Lesson 16, seventh grade, third term.
" 50. Lessons 34 and 35, seventh grade, third term.

EIGHTH GRADE — FIRST TERM.

To the Teacher.—The work of this term is a review of the work of the seventh grade. Teachers can take up this review work in the order indicated below, or they can modify it to suit the needs of the class. It is believed, however, that the selection of review lessons will prove satisfactory in most cases, and will give a thorough review of all topics presented in seventh grade work.

LESSON 1. Lessons 1 and 2, seventh grade, first term.
" 2. Lessons 4 and 5, seventh grade, first term.
" 3. Lessons 7 and 8, seventh grade, first term.
" 4. Lessons 10 and 11, seventh grade, first term.
" 5. Lessons 13 and 14, seventh grade, first term.
" 6. Lessons 22 and 23, seventh grade, first term.
" 7. Lessons 34 and 35, seventh grade, first term.
" 8. Lessons 24 and 25, seventh grade, first term.
" 9. Lessons 26 and 27, seventh grade, first term.
" 10. Lessons 28 and 29, seventh grade, first term.
" 11. Lessons 40 and 41, seventh grade, first term.
" 12. Lessons 42 and 43, seventh grade, first term.
" 13. Lessons 44 and 45, seventh grade, first term.
" 14. Lessons 1 and 2, seventh grade, second term.
" 15. Lessons 3 and 4, seventh grade, second term.
" 16. Lessons 9 and 10, seventh grade, second term.
" 17. Lesson 22, seventh grade, second term.
" 18. Lesson 23, seventh grade, second term.
" 19. Lesson 24, seventh grade, second term.
" 20. Lesson 34, seventh grade, second term.

LESSON 21. Lesson 35, seventh grade, second term.
" 22. Lesson 37, seventh grade, second term.
" 23. Lesson 38, seventh grade, second term.
" 24. Lesson 48, seventh grade, second term.
" 25. Lesson 39, seventh grade, second term.
" 26. Lesson 40, seventh grade, second term.
" 27. Lesson 41, seventh grade, second term.
" 28. Lesson 25, seventh grade, third term.
" 29. Lesson 3, seventh grade, third term.
" 30. Lesson 4, seventh grade, third term.
" 31. Lesson 5, seventh grade, third term.
" 32. Lesson 15, seventh grade, third term.
" 33. Lesson 16, seventh grade, third term.
" 34. Lesson 17, seventh grade, third term.
" 35. Lesson 18, seventh grade, third term.
" 36. Lesson 19, seventh grade, third term.
" 37. Lesson 34, seventh grade, third term.
" 38. Lesson 35, seventh grade, third term.
" 39. Lesson 30, seventh grade, second term.
" 40. Lesson 31, seventh grade, second term.
" 41. Lesson 32, seventh grade, second term.
" 42. Lesson 33, seventh grade, second term.
" 43. Lesson 36, seventh grade, second term.
" 44. Lesson 46, seventh grade, second term.
" 45. Lesson 47, seventh grade, second term.
" 46. Lesson 6, seventh grade, third term.
" 47. Lesson 7, seventh grade, third term.
" 48. Lesson 20, seventh grade, third term.
" 49. Lesson 21, seventh grade, third term.
" 50. Lesson 36, seventh grade, third term.

EIGHTH GRADE — SECOND TERM.

To the Teacher. — **Before assigning this lesson, teach 293 . . . 321. Develop these definitions carefully.**

LESSON 1. 1. Learn 293 . . . 321.

2. Find the cost of 60 shares of bank stock at 98.

3. What is the annual income from $12500 bank stock, which pays a semi-annual dividend of 4% ?

4. A man sold 35 shares of bank stock at 48⅞% premium, brokerage ⅛%. How much did he receive for it ?

5. How much bank stock paying a dividend of 7%, will produce an annual income of $455 ?

6. What is the market value of eight $1000 bonds at 16% premium ?

7. I have $2800 of the stock of the Exchange Bank, on which I receive a semi-annual dividend of 4%. I bought the stock at 135. What did it cost?

8. Paid $4500 for mining stock at 10% below par and afterward sold it at 14% premium. How much did I gain ?

9. How much will 125 shares of stock cost at 14½% below par, brokerage ⅛% ?

10. A broker sold for a customer 25 $500 U. S. bonds at 114, brokerage ¼%. How much did the owner receive for them ?

LESSON 2. 1. Learn 293 . . . 321.

2. If I buy 10% stock at 24¾% premium, brokerage ¼%, what rate of interest do I receive on my investment ?

3. How much will 125 shares of railroad stock cost at 14½% below par, brokerage ⅛%?

4. An insurance company invested $44990 in railroad bonds at 2% premium, brokerage ¼%. Find the par value.

5. What will be the yearly income from an investment of $12875 in 4% city bonds, bought at 2½% premium, brokerage ½%?

6. A man sold $25000 railroad stock at 108⅜, brokerage ⅛%. How much did he receive for it?

7. How much must I invest in 6% railroad stock at 12¼% premium, brokerage ¼%, to secure an annual income of $1260?

8. I bought 85 shares of railroad stock at 127⅜, brokerage ⅛%, and sold it at 135⅛, brokerage ⅛%.

9. How much income will a person receive annually from 160 shares of bank stock of $50 each, if the stock pays a semi-annual dividend of 3½%?

10. A man bought railroad stock at 102⅝, brokerage ⅜%, paying $2575 for it.

LESSON 3. 1. Learn 293 . . . 321.

2. I sold through a broker 220 shares of stock at 165¾, brokerage ⅛%. How much did I receive for it?

3. What is the rate of income on money invested in 6% bonds, if purchased at 16% discount?

4. Find the cost of $25000 railroad stock at 42% discount, brokerage ⅛%.

5. A company whose capital is $150000 pays a semi annual dividend of 6%, after deducting $6750 for annual expenses. A owns 75 shares of the stock and B 140 shares. Find the gross earnings and A's and B's dividend.

6. How much bank stock at 62½% premium can be bought for $7800?

7. How much greater income will a man receive from $10000 invested in 6% railroad bonds at par, than from $14000 invested in 4% government bonds at 112?

8. Bought 40 shares of railroad stock at 7½% above par, brokerage ¼%. Find the cost.

9. I invested $1130 in U. P. stock at 28, brokerage ¼%, and sold it the same day at 35, brokerage ⅛%.

10. I invested $66075 in 5% railroad bonds at 109⅞, brokerage ¼%. Find the par value of the bonds bought.

LESSON 4.

1. Learn 293 . . . 321.

2. A broker sold $150000 of the first mortgage 5% bonds of a railroad company at 103¼, brokerage ⅛%. How much did the owner receive for them?

3. A has an annual income of $900 from 6% railroad stock, bought at 5¼% discount, brokerage ¼%.

4. I bought New York City bonds at 95. If they pay 5%, what is the rate of income on the investment?

5. How much will 250 shares of railroad stock cost at 57, brokerage ⅛%?

6. What will be the annual income from 145 shares of railroad stock, bought at 108, if the stock pays a quarterly dividend of 1½%?

7. I sent my broker $6300 with which to buy stock at 74⅞, brokerage ⅛%. How many shares did I get?

8. What annual income will a man receive, if he invests $39720 in bank stock paying a semi-annual dividend of 4%?

9. An insurance company, wishing to distribute among the stockholders the net profits, $10500, declares a dividend of 7%. What is the amount of capital?

10. I received a 6% dividend on railroad stock, which I bought at 20% premium. What was the rate of income on the investment?

LESSON 5. 1. Learn 293 . . . 321.

2. What is the market value of twenty-five $500 government bonds at 8½% premium?

3. A owns 175 shares of the stock of a gas company, on which he receives a semi-annual dividend of 6%. He bought the stock at 185. Find the cost.

4. A man received $4445 for bank stock, which a broker sold for him at 128, brokerage 1%. He bought the stock at 4% premium, brokerage ½%.

5. A man sold a farm, which he had rented for $600, receiving $10240 for it, and invested the money in U. S. 5% bonds at 128.

6. Sold through a broker 75 shares of railroad stock at 74⅝, brokerage ⅛%.

7. Bought some 5% railroad stock at 82 and received a dividend of $360.

8. Which is the better investment, stock paying a dividend of 6%, bought at 75, or 7% stock, bought at 175?

9. A man bought $50000 of the stock of a mining company at 82% below par and sold it at 45.

10. A man sold a farm of 205 acres at $40 an acre and invested the money in railroad stock at 2% above par, brokerage ½%.

LESSON 6. 1. Learn 293 . . . 321.

2. Sold bank stock, on which I had received a semi-annual dividend of 5%, at 85% premium, receiving $25900 for it. Find the annual dividend.

3. How much 7% bank stock must be bought at 115¾, brokerage ¼%, to give a semi-annual dividend of $770?

4. If a man buys 4% stock at 20% discount, what is the rate of interest on his investment?

5. The trustees of a college invested an endowment fund in three hundred $500 government bonds bearing 4% interest, at 114½. Find the sum invested and the annual income.

6. How much will I receive annually from $7500 railroad stock, bought at 95, if the stock pays a semi-annual dividend of 4½%?

7. A broker received $13500 to invest in railroad stock at 12¼% premium, brokerage ¼%. How many shares did he buy?

8. A man invested $17010 in bank stock at 162. The stock pays a dividend of 8%. Find his yearly income.

9. I exchanged twenty-five $500 U. S. bonds at 20% above par for bank stock at 150.

10. A man receives $185 as his quarterly interest on 4% U. S. bonds, bought at 106.

LESSON 7. 1. Learn 293 . . . 321.

2. What rate of interest on the investment will 10% stock pay, if bought at $160 a share?

3. My broker bought for me 175 shares of stock at 62½% discount, brokerage ⅛%. Find the cost.

4. A bought 75 shares of telegraph stock at 12% discount, on which he receives a semi-annual dividend of 2¼%.

5. A man purchased 5% railroad stock at 3⅝% discount, brokerage ⅛%, paying $1351 for it.

6. A man has a semi-annual income of $420 from 6% city bonds, bought at 3⅜% premium, brokerage ⅛%.

7. A bought 12% stock at 80% premium. What is the rate of income on his investment?

8. I bought $20000 of the capital stock of a steamship company at 12½% above par.

9. How many $500 state bonds at 7½% premium can be bought for $7560, brokerage ½%?

10. Received $4747.50 for 5% bonds, sold at 5¾% premium, brokerage ¼%.

11. A man exchanged 120 shares of railroad stock at 77⅞% discount for telegraph stock at 39⅞, brokerage in each case ⅛%.

LESSON 8.

1. A man received an annual income of $840 from 6% state bonds, bought at 8⅞% premium, brokerage ⅛%. Find the cost of the bonds.

2. Received a dividend of 8% on mining stock, bought at 20% discount. Find the rate on the investment.

3. A broker bought 140 shares of telegraph stock at 22⅜%, brokerage ⅛%. What did it cost the investor?

4. A man owns fifteen $1000 U. S. bonds, on which he receives quarterly interest of 1¼%. He bought the bonds at 4½% premium, brokerage ¼%.

5. I invested $7900 in city bonds of the denomination of $500, at 1½% below par, brokerage ¼%. How many bonds did I buy?

6. A capitalist invested $125400 in 6% Chicago city bonds, paying a premium of 4¼%, brokerage ¼%. Find his annual income.

7. The net earnings of a railroad were $202500 in one year, which enabled the directors to declare a dividend of 4½%. A's dividend is $1125 and B's $1980.

8. Which is the more profitable, to buy 8% bonds at 125, or 6% bonds at 10% discount?

9. Bought 50 shares of bank stock, which pays a dividend of 8%, at 42½% premium.

10. A bank whose capital stock is $200000 pays a semi-annual dividend of 5%. The year's profits are $32755 and the expenses $8755. How much is added to the surplus fund?

LESSON 9.

1. A broker received $1375 to be invested in railroad stock at 65¾% discount, brokerage ⅛%.

2. A man bought 8% stock at par, and after keeping it two years, he sold it at 145¼, brokerage ¼%, receiving $11600 for it. Find the annual dividend and the gain.

3. My broker sold for me $12000 railroad stock at 12⅜% above par, brokerage ⅛%. How much did I receive for it?

4. What sum must I invest in railroad stock that pays a semi-annual dividend of 4½% to obtain an annual income of $1152, the market value of the stock being 124¾, brokerage ¼%?

5. If a man buys 4% government bonds at 119¾, brokerage ¼%, what rate of interest does the investment pay?

6. I paid my broker $3780 for railroad stock, which he bought for me at 7⅞% premium, brokerage ⅛%. How many shares did he buy?

7. Which is the better investment, 3% stock at 25% discount, or 5% stock at 4% premium?

LESSON 12. 1. Learn 293 . . . 321.

2. I received $10560 for railroad bonds, which a broker sold for me at 88½, brokerage ½%. I bought the bonds at par. How much did I lose?

3. A man invested $47250 in U. S. 4's at 12½% above par, the income to be divided equally between his two daughters. How much did each receive?

4. A man sold his farm for $27000 and invested a part of the money in 5% city bonds at 103 sufficient to give him an income of $1100 a year, and bought a house with the remainder. Find the cost of the house.

5. If bank stock which pays a semi-annual dividend of 5% is bought at 160, what annual rate of interest does the investor receive on his money?

6. A man owns 225 shares of the stock of a corporation whose capital is $2500000. The gross earnings in a year are $473257. The expenses and losses are $268257. The bonded indebtedness is $1000000, bearing 5½% interest.

7. A speculator bought 50 shares of railroad stock at 24% premium and sold it at 132, brokerage in each case ⅛%.

8. A company whose capital stock is 3500 shares of $50 each pays a semi-annual dividend of 3½%. The expenses are $4500. Find the gross income.

9. A man received $14260 for 5% bonds, sold at 15⅛% premium, brokerage ⅛%, and invested the money in 6% bonds at 123⅞, brokerage ⅛%.

10. A speculator sold 140 shares of railroad stock, which cost him $9100, at 70⅛, brokerage ⅛%.

11. A man has 4% U. S. bonds on which the quarterly interest amounts to $480. He bought the bonds at 105.

TO THE TEACHER. — Teach 322 . . . 328.

LESSON 13. 1. Learn 322 . . . 328.

2. A man owes $100 due in 4 months, and $300 due in 8 months. What is the equated time for the payment of both debts, if both terms of credit begin to-day?

3. A merchant bought several bills of goods as follows: Jan. 12, $400, on two months' credit; Jan. 18, $350, on 3 months' credit; Feb. 8, $285, on 3 months' credit; and Feb. 26, $345, on 3 months' credit. Find the equated time for the payment of the several bills.

4. A owes B $1400, of which $300 is due in 1 month, $400 in two months, $400 in 3 months, and the remainder in 6 months. What is the equated time for the payment of the whole, if all the terms of credit begin to-day?

5. March 12 a man bought goods for $684 on 90 days' credit. On April 18 he paid $475. Find the equated time for the payment of the remainder.

6. A merchant bought the following bills of goods on 3 months' credit: Apr. 8, $225; Apr. 20, $165; May 6, $275; May 29, $340; and June 18, $145. On what date could he equitably have paid the whole amount?

7. What is the equated time for the payment of $400, due in 20 days; $300, due in 30 days; $200, due in 60 days; and $100, due in 90 days, if all the terms of credit begin to-day?

LESSON 14. 1. Learn 322 . . . 328.

2. A man owes $500, payable in 2 months; $400, payable in 3 months; $400, payable in 4 months; and $600, payable in 6 months. If all the terms of credit begin to-day, when may he equitably pay the whole amount?

3. June 8 I bought a span of horses for $550, agreeing to pay for them in 3 months without interest. July 8 I paid $250. Find the equated time for the payment of the remainder.

4. Sold the following bills of goods on 2 months' credit: Sept. 4, $185; Sept. 18, $212; Oct. 3, $245; Oct. 18, $195; Oct. 28, $225; Nov. 8, $245. On what date could I equitably have paid the whole amount?

5. A man bought a bill of goods amounting to $2800, payable as follows: $600 in 2 months, $800 in 3 months, $700 in four months, and the remainder in 5 months. If he bought the goods Apr. 12, 1892, on what date could he equitably have paid the whole amount?

6. March 14 a merchant bought goods for $935 on 4 months' credit. April 14 he paid $300, and May 14, $300. When should he have paid the remainder?

7. A merchant has the following charges against a customer: March 16, $286, on 3 months' credit; March 28, $325, on 4 months' credit; Apr. 14, $295, on 3 months' credit; Apr. 22, $345, on 4 months' credit. Find the equated time for the payment of the whole sum.

LESSON 15.

1. Learn 322 . . . 328.

2. A merchant owes $2400, of which $400 is due to-day, $600 in 2 months, $600 in 3 months, and the remainder in 4 months. Find the equated time for the payment of the whole amount.

3. A merchant bought several bills of goods as follows: Apr. 4, $245, on 3 months' credit; Apr. 16, $185, on 2 months' credit; Apr. 24, $375, on 3 months' credit; May 16, $435, on 4 months' credit. On what date could he equitably have paid the several bills?

4. What is the equated time for the payment of $300 due to-day; $400 due in 30 days; $200 due in 40 days; $350 due in 60 days; and $225 due in 90 days?

5. If I buy a bill of goods to-day for $1380 on 90 days' credit and pay $400 on them at the time of purchase, what *is the equated time* for the payment of the remainder?

6. I bought the following bills of goods on 60 days' credit: Oct. 12, \$235; Oct. 24, \$350; Nov. 6, \$295; Nov. 22, \$265; Dec. 8, \$185. On what date could I equitably have paid the whole amount?

7. A owes B \$1500, payable in four equal parts, in 1, 2, 3, and 4 months respectively. If all the terms of credit begin to-day, what is the equated time for the payment of the whole amount?

To the Teacher. — Teach 329 . . . 337.

LESSON 16. 1. Learn 329 . . . 337.

2. I bought several bills of goods as follows: June 4, \$185, on 3 months' credit; June 18, \$265, on 2 months' credit; July 8, \$448, on 3 months' credit; Aug. 9, \$375, on 4 months' credit. What was the equated time for the payment of the several bills?

3. Find the equated time for the payment of \$1700, payable in four equal parts, in 1, 2, 3, and 4 months from to-day respectively.

4. A merchant sold the following bills of goods on 60 days' credit: March 4, \$265; March 18, \$185; Apr. 8, \$315; Apr. 27, \$270; May 16, \$345. On what day could he equitably have accepted the whole amount?

5. Aug. 8 a merchant bought goods for \$1250 on 4 months' credit. If he paid \$600 Oct. 8, when should he have paid the remainder?

6. A merchant bought a bill of goods amounting to \$1800, payable as follows: $\frac{1}{6}$ in 2 months, $\frac{1}{3}$ in 3 months, $\frac{1}{4}$ in 4 months, and the remainder in 5 months. If he bought the goods Oct. 18, 1892, on what date could he equitably have paid the whole amount?

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7. I have the following charges against a customer: July 8, $265, on 4 months' credit; July 24, $315, on 3 months' credit; Aug. 14, $385, on 4 months' credit; Aug. 29, $435, on 3 months' credit. On what date can I equitably accept payment of the whole amount?

TO THE TEACHER. — Teach 338 . . . 345.

LESSON 17. 1. Learn 329 . . . 345.

2. What is the equated time for the payment of $500, due to-day; $400, due in 30 days; $375, due in 60 days; and $280, due in 90 days?

3. April 14 a merchant bought goods for $840 on 90 days' credit. If he paid $400 on the account May 16, when should he have paid the remainder?

4. Sold the following bills of goods on 3 months' credit: Aug. 7, $280; Aug. 22, $360; Sept. 4, $385; Sept. 28, $235; Oct. 15, $415. Find the equated time for the payment of the whole amount.

5. A man owes a debt of $1800, payable in five equal parts, in 1, 2, 3, 4, and 5 months respectively. On what date may he equitably pay the whole amount, if all the terms of credit begin to-day?

6. June 18 a merchant bought goods for $1800 on 4 months' credit. If he paid $300 Aug. 18, when should he have paid the remainder?

7. A merchant has the following charges against a customer: March 12, $430, on 3 months' credit; March 27, $235, on 2 months' credit; Apr. 16, $485, on 4 months' credit; May 3, $365, on 4 months' credit. On what date can he equitably accept payment of the whole amount?

TO THE TEACHER. — Teach 346 and 347.

LESSON 18.

1. Learn 329 . . . 347.

Simplify the following ratios:

2. 34 : 85
3. $3\frac{2}{3} : 2\frac{3}{4}$
4. $\frac{8}{9} : \frac{4}{15}$
5. 9 in. : 2 yd.
6. $\begin{cases} 4 : 6 \\ 9 : 8 \end{cases}$
7. 6 : 10 : : ? : 25
8. 15 : 5 : : $48.75 : ?

9. If 3 barrels of flour cost $14.25, how much will 9 barrels cost?

10. If the interest of a certain sum of money for 8 months is $56, in how many months will the same sum yield $77 interest?

11. If five yards of silk cost $8.75, how many yards will cost $28?

12. If 4 men can cut 36 cords of wood in 12 days, how many cords can 6 men cut in 14 days?

13. If $\frac{3}{4}$ of an acre of land is worth $42, how much are $6\frac{1}{2}$ acres worth at the same rate?

14. If 9 horses eat 108 bushels of oats in 48 days, how many bushels will last 11 horses 60 days?

15. If 2 lb. 9 oz. of tea cost $1.64, how much will 5 lb. 14 oz. cost at the same price?

16. If 9 men can do a piece of work in 12 days, working 8 hours a day, how many hours a day must 18 men work to finish it in 8 days?

LESSON 19.

1. Learn 329 . . . 347.

Reduce the following ratios to their simplest form:

2. $8\frac{3}{4} : 1\frac{3}{5}$
3. .008 : .16
4. 3 rd. : $2\frac{3}{4}$ yd.
5. $9.42 : $21.98
6. $\begin{cases} 150 : 90 \\ 63 : 162 \end{cases}$
7. $4\frac{2}{4}$: ? : : $1\frac{3}{8} : 1\frac{5}{6}$
8. ? : 30 : : $14.28 : $35.70

9. What will $6\frac{3}{4}$ pounds of tea cost, if $5\frac{1}{2}$ pounds cost $4.40?

10. If 7 men can do a certain piece of work in 12 days, in how many days can 4 men do the same work?

11. If 8 men can build 108 rods of wall in 18 days, in how many days can 12 men build 72 rods?

12. If $\frac{3}{8}$ of a yard of silk costs 45 cents, how many yards can be bought for $12?

13. If 70 square rods of ground yield 44 bushels of potatoes, how many bushels will $3\frac{1}{2}$ acres yield at the same rate?

14. If $1250 yields $25 interest in three months, how much must be invested at the same rate per annum to yield $148 in 16 months?

15. If 5 yd. 1 ft. 6 in. of ribbon cost $3.74, how many yards can be bought for $5.61?

16. How many hours a day must 4 men work to do half as much work in 10 days as 15 men can do in 4 days, working 10 hours a day?

LESSON 20. **1.** Learn 329 . . . 347.

Find the value of the following ratios:

2. 85 : 15

3. 1.5 : 1.95

4. 3 lb. : 18 pwt.

5. $\begin{cases} 1\frac{2}{3} : 7 \\ 3\frac{1}{2} : \frac{3}{4} \\ 4\frac{2}{5} : 1\frac{2}{9} \end{cases}$

6. $\begin{cases} \frac{3}{5} : \frac{9}{14} \\ 2\frac{2}{3} : \frac{2}{9} \\ 2\frac{4}{7} : 3\frac{1}{5} \end{cases}$

7. 4 rd. : 11 yd. :: $8.75 : ?

8. $\frac{4}{9}$: ? :: 4 : $4\frac{1}{2}$

9. If 15 quarts of berries cost $1.80, how many bushels will cost $24?

10. How many men can do a piece of work in 24 days that 8 men can do in 18 days?

11. If a farmer receives $7.37 for .44 of a ton of hay, how much should he receive for $4\frac{1}{2}$ tons, if sold at the same price?

12. If 8 men can do $\frac{2}{3}$ of a piece of work in 9 days, how many men can do the whole of it in 4 days?

13. If the interest of $850 for a certain time is $29.75, what principal will yield $140 interest in the same time?

14. If 4 gal. 3 qt. of molasses cost $3.61, what is the price per gallon?

15. If a pile of wood 72 ft. long, 4 ft. wide, and 4 ft. high is worth $40.50, what is the value of a pile 96 ft. long, 8 ft. wide, and 4 ft. high?

16. If 14 men can dig a ditch 120 ft. long, 8 ft. wide, and 6 ft. deep in 12 days, in how many days can 18 men dig a ditch 180 ft. long, 12 ft. wide, and 4 ft. deep?

LESSON 21. **1.** Learn 329 . . . 347.

Simplify the following ratios:

2. $6\frac{5}{7} : 10\frac{4}{9}$

3. $24.39 : $10.84

4. 9 score : 5 gross

5. $\begin{cases} 35 : 55 \\ 21 : 10 \\ 22 : 14 \end{cases}$

6. $\begin{cases} \frac{5}{7} : \frac{3}{4} \\ 2\frac{1}{4} : 4\frac{6}{7} \\ 5\frac{2}{3} : 1\frac{1}{4} \end{cases}$

7. $9\frac{1}{2} : 19 :: ? : 1\frac{1}{4}$

8. 4 yd. : 5 ft. :: $2.04 : ?

9. How much will 28 yards of silk cost, if 17 yards cost $23.80?

10. If a train runs 255 miles in 5 hours 40 minutes, how far will it run in 9 hours 20 minutes at the same rate?

11. If $\frac{5}{8}$ of a farm is worth $6250, what part of it is worth $8000?

12. If the interest of $2500 for 8 months is $100, in how many months will the interest of $800 amount to $56?

13. If 9 men can do a piece of work in 12 days, how many men can do 4 times as much in 18 days?

14. How many oats will 11 horses consume in 13 days, if 17 horses eat 55 bu. 3 pk. 1 qt. in 21 days?

15. How many men can dig 175 rods of ditch in 10 days, if 5 men can dig 150 rods in 12 days?

16. If 8 men can excavate a cellar 50 ft. long, 36 ft. wide, and 8 ft. deep in 20 days of 8 hours each, how many hours a day must 12 men work to excavate a cellar 45 ft. long, 25 ft. wide, and 6 ft. deep in five days?

LESSON 22.

1. Learn 329 . . . 347.

Reduce the following ratios to their simplest form:

2. $\frac{14}{15} : \frac{7}{20}$

3. $.35 : 10.5$

4. $639 : 781$

5. $\left\{\begin{array}{l} 3 : 5 \\ 7 : 1 \\ 5 : 7 \end{array}\right.$

6. $\left\{\begin{array}{l} \frac{7}{9} : 3\frac{1}{3} \\ \frac{4}{11} : 5\frac{1}{2} \\ 1\frac{2}{3} : 2\frac{1}{3} \end{array}\right.$

7. $14 : ? :: 24 : 16$

8. $? : 12 :: \$8.20 : \$3.28$

9. How many bushels of potatoes cost $6.38, if 2 bu. 3 pk. cost $2.42?

10. In how many days can 24 men do $\frac{4}{5}$ of a piece of work, if 15 men can do the whole of it in 40 days?

11. On what sum will the interest amount to $54, if the interest of $640 for the same time is $28.80?

12. If 14 ounces of tea cost 70 cents, how much will $4\frac{3}{4}$ pounds cost?

13. How many days of 9 hours each must 10 men work to do a piece of work that 6 men can do in $13\frac{1}{2}$ days of 10 hours each?

14. How much will it cost to build a wall 80 ft. long, 6 ft. high, and 18 in. thick, if a wall 50 ft. long, 8 ft. high, and 2 ft. thick costs $200?

15. If 12 men can do a piece of work in 15 days, in how many days can they perform the work with the assistance of 8 men more?

16. If 7 men can build a wall 40 ft. long, 4 ft. wide, and 6 ft. high in 24 days, how many days will it take 9 men to build a wall 24 yd. long, 4 ft. wide, and 10 ft. high?

LESSON 23.

1. Learn 329 . . . 347.

Find the value of the following ratios:

2. $9\frac{4}{5} : 2\frac{1}{10}$

3. 5 rd. : $2\frac{2}{3}$ yd.

4. \$10.62 : \$47.79

5. $\left\{\begin{array}{l} 14 : 6 \\ 18 : 10 \\ 20 : 21 \end{array}\right.$

6. $\left\{\begin{array}{l} \frac{3}{7} : \frac{5}{6} \\ 2\frac{1}{3} : 3\frac{3}{4} \\ 2\frac{1}{2} : 2\frac{2}{5} \end{array}\right.$

7. $\frac{3}{7} : 2\frac{1}{7} :: ? : 5$

8. $? : .012 :: 3\frac{1}{3} : .02$

9. How many yards of carpet will cost \$77, if 25 yards cost \$43.75?

10. If sound travels 5590 feet in five seconds, how far does it travel in one minute?

11. If $\frac{3}{7}$ of a pile of wood is worth \$18.60, how much is .9 of it worth?

12. In how many days can 4 men do a piece of work, if 14 men can do the same work in 12 days?

13. If 18 men can do a piece of work in 28 days, how many men may be withdrawn and the work finished in 36 days?

14. If a man can travel 360 miles in 20 days of 12 hours each, in how many days of 8 hours each can he travel 390 miles?

15. If a bin 12 ft. long, $8\frac{1}{5}$ ft. wide, and $7\frac{1}{2}$ ft. deep holds $590\frac{2}{5}$ bushels, how deep must another bin be made that is 14 ft. long and 9 ft. wide to hold 840 bushels?

16. If 12 men can build a wall 48 yd. long, 5 ft. wide, and 8 ft. high, in 10 days of 8 hours each, how many men will it take to build a wall 120 ft. long, 3 ft. wide, and 12 ft. high, in 5 days of 9 hours each?

LESSON 24.

1. Learn 329 . . . 347.

2. $\frac{5}{7} : ? :: 4\frac{1}{6} : 3\frac{1}{2}$

3. 5 : ? :: \$12.05 : \$21.69

4. Find the ratio of 12 gallons to 11 cubic feet.

5. Find the ratio of a field 35 rd. long and 18 rd. wide, to a field 21 rd. long and 15 rd. wide.

6. If 864 cubic inches of water weigh 31 pounds, how much will a cubic yard weigh ?

7. If 1 ft. 6 in. of ribbon is worth 64 cents, how many yards will cost $4.48 ?

8. What sum will yield $63 interest in 9 months, if the interest of $1800 for one year 8 months is $180 ?

9. How many men can do $\frac{5}{6}$ of a piece of work in 15 days, if 18 men can do $\frac{4}{5}$ of it in 20 days ?

10. If 14 men can do a piece of work in 20 days, how many men can do three times as much in $\frac{3}{5}$ of the time ?

11. If the interest of a certain sum of money for 8 months is $49.60, in how many months will the same sum yield $62 interest ?

12. Eighteen men are engaged to do a piece of work in 24 days. After 6 days, 6 men stop work. In how many days can the rest finish the work ?

13. If 60 men, working 8 hours a day, can dig a ditch 350 ft. long, 11 ft. wide, and $2\frac{1}{3}$ ft. deep, in 44 days, in how many days of 9 hours each can 96 men dig a ditch 252 ft. long, $16\frac{2}{3}$ ft. wide, and $3\frac{1}{2}$ ft. deep ?

To the Teacher. — Teach 348 . . . 354.

LESSON 25. 1. Learn 348 . . . 354.

2. A and B entered into partnership. A furnished $6000 of the capital and B $4000. Their profits were $2600. What was each one's share ?

3. A, B, and C engaged in business with a joint capital of $18000. A put in $9000, B $6000, and C the remainder. If their profits were $4500, what was each partner's share ?

4. A, B, and C entered into partnership. A put in $8000 for one year, B $6000 for 9 months, and C $5000 for 6 months. Their profits were $3225. What was each partner's share?

5. A and B bought land for $36000, A investing $22000 and B $14000. If they sold it at a profit of $7200, what was each one's share of the gain?

6. A and B formed a partnership for one year. A put in $6000 and B $5000. At the end of 3 months A added $2000 to his capital; and at the end of 4 months B put in $3000 more. If their profits were $3219, what was each partner's share?

LESSON 26.

1. Learn 348 . . . 354.

2. A, B, and C formed a partnership. A invested $6000 and B and C each $9000. If their profits were $5624, what was each partner's share?

3. A, B, and C hire a pasture for $110.70. A put in 5 cows, B 6 cows, and C 7 cows. How much should each have paid?

4. Jan. 1 A and B entered into partnership for one year. A put in $6000 and B $10000. Apr. 1 A added $2000. May 1 B took out $1500. If their profits for the year were $3885, what was each one's share?

5. A and B formed a partnership with a capital of $18000, A investing twice as much as B. If they gained $2725, what was each one's share?

6. A and B formed a partnership. A put in $4000 for one year. B's capital was in the business 6 months. Their profits were $2247, of which A took $1284. What was B's capital?

LESSON 27. 1. Learn 348 . . . 354.

2. A, B, and C formed a partnership with a joint capital of $22000. A and B each put in $7000 and C the remainder. If they gained $7062, what was each partner's share?

3. A and B formed a partnership for a year, each investing $6000. After three months A put in $2000 more; and at the end of 6 months B put in $3000 more. If their profits were $4441.50, what was each one's share?

4. A and B engaged in business with a capital of $20000, A putting in three times as much as B. If they gained $3700, what was each one's share?

5. Apr. 1 A and B entered into partnership for one year, each furnishing $4000 capital. July 1 A added $1000, and Oct. 1 he added $2000 more. June 1 B added $4000, and Nov. 1 he took out $2000. What share of the profits should each receive at the end of the year, if they gained $3724?

6. Jan. 1 A started in business with a capital of $6000; Apr. 1 he took B into partnership. Later in the year they took in C as partner with $10000 capital. At the end of the year their profits were $3916, of which A took $1320 and C $550. Find B's capital and the time when C became a member of the firm.

LESSON 28. 1. Learn 348 . . . 354.

2. A, B, and C engaged in business together. A put in $8000, B $2000 more than A, and C $4000 more than B. Their profits were $6432. What was each partner's share?

3. Oct. 1 A and B formed a partnership. A put in $8000, and B $10000. Jan. 1 A added $4000, and Apr. 1 he took out $1000. Jan. 1 B took out $2000, and Apr. 1 he added $3000. Apr. 1 they took in C as partner, who put

in $8000 capital. Their profits for the year ending Oct. 1 were $6958. What was each partner's share ?

4. A, B, and C bought property, A and B each investing $24000 and C $12000. If they sold it at a profit of $18000, to how much of the profit was each entitled ?

5. A, B, and C engaged in partnership, each investing $10000. After 3 months A added $2000 to his capital. At the end of 4 months B took out $2000, and C increased his capital to $15000. Their profits at the end of the year were $8442. What was each partner's share ?

6. A, B, and C formed a partnership with a capital of $25000. A and B each put in twice as much as C. If they gained $6425, what was each partner's share ?

7. May 1 A started in business. July 1 he formed a partnership with B, and on Sept. 1 C became a member of the firm. At the end of a year from the time A started in business A was entitled to $1680 of the profits, B $1120, and C $1568. Their joint capital was $16000. How much of the capital did each furnish ?

LESSON 29.

1. Learn 293 . . . 321.

2. What is the rate of interest on money invested in bank stock, purchased at $180 a share, if the stockholders receive a semi-annual dividend of 6% ?

3. A man sold a house and with the money bought 100 shares of railroad stock at 67½% below par, brokerage ¼%.

4. A man sold $11000 of 4% railroad stock at 6¼% discount, brokerage ¼%, and invested the proceeds in 6% bonds at 9⅞% premium, brokerage ⅛%.

5. A man receives a semi-annual dividend of $600 on 8% bank stock. He bought the stock at 138. Find the cost.

6. Bought bank stock, which pays a semi-annual dividend of 5½%, at 80% premium. What is the rate of income on the investment?

7. The gross earnings of a railroad are $1556283 in a year. The expenses and losses are $1106283. The company pays 6% interest on a debt of $1500000. If the capital is $6000000, what rate of dividend can be declared?

8. A broker bought for a customer 500 $500 government bonds at 113⅜, brokerage ⅛%. Find the cost.

9. A ferry company whose capital is $75000 pays an annual dividend of 9%, after paying the expenses amounting to $3250. A owns 65 and B 78 shares of the stock. Find the gross earnings and A's and B's dividend.

10. A man invested $6864 in government bonds at 106, brokerage 1¼%, and afterward sold them at 112, brokerage 1½%. How much did he gain?

11. A man sends his broker $30108 and directs him to invest one-third of it in 4% city bonds at 3¾% discount, and the remainder in 5% state bonds at 103¾, brokerage in each case ¼%. What will be his yearly income?

LESSON 30.

1. Learn 293 . . . 321.

2. A broker sold for an estate $40000 5% city bonds at 116½, brokerage ⅛%. What did the estate receive for them?

3. What will be received for some 8% bank stock which pays a semi-annual dividend of $420, if sold at 135?

4. I receive a quarterly income of one per cent on government bonds. I bought them at 10% premium. What annual rate of interest do I receive on the investment?

5. Bought $60000 of the stock of a mining company at 14% discount and sold it at 96. How much did I gain?

6. A man bought forty $500 government bonds at 12% premium, on which he receives quarterly interest of 1%.

7. A capitalist sold 540 shares of 6% stock at 110¼, brokerage ¼%, and invested the money in 5½% state bonds at 10¼% discount, brokerage ¼%. How much was his yearly income increased or diminished?

8. If I sell $15000 U. S. 6% bonds at 30% premium and invest enough of the money in 5's at 4% above par to secure an annual income of $800, how much will I have left, brokerage ¼% in each transaction?

9. Which is the better investment, 5% bonds at 80, or 6% bonds at 90?

10. A bank, whose capital is $150000 has $13400 as the net profit of the year's business. They decide to pay as high an integral rate of dividend as possible and add the remainder to the surplus fund. How much can they add to the surplus?

11. A man bought 100 $1000 city bonds, bearing 5% interest, at 6% above par. Find the cost and the annual income.

LESSON 31.

1. Learn 293 . . . 321.

2. A man invested $4524 in bank stock at 88½% above par. The stock pays a semi-annual dividend of 5%.

3. Sold 120 shares of railroad stock at 8½% above par, brokerage ⅛%. How much did I receive for it?

4. A man bought some $500 4% government bonds at 106 and receives $125 quarterly interest. How many bonds did he buy?

5. If railroad stock, which pays a quarterly dividend of 1¾%, is bought at 40% above par, what annual rate of interest does the investor receive on his money?

6. A man bought 125 shares of telegraph stock at par and sold it at 88. Find his loss.

7. The net profits of a bank, having a capital of $125000, are $11500. If the bank pays a semi-annual dividend of 3%, what sum is added to the surplus fund?

8. A man sent his broker $12540 to be invested in railroad stock at 104⅜, brokerage ⅛%. How many shares did he get?

9. How much greater annual income will be received from $9200 invested in 6% bonds at 15% premium than by loaning the same sum at 5% interest?

10. A man receives a dividend of $284 on 4% stock, which he bought at $96.50 a share. How much did it cost?

11. What rate of income will be realized on money invested in stock at 10% discount, if the stock pays a semi-annual dividend of 5%?

LESSON 32.

1. The net profits of a bank whose capital is $150000, were $18285 in a year. The directors added $6285 to the surplus fund and distributed the remainder among the stockholders. B owns 175 shares of the stock. How much is his dividend?

2. A broker bought for me 200 shares of bank stock at 3⅛% premium, brokerage ⅛%. Find the cost.

3. A receives an annual dividend of 7% on $14500 insurance stock, which he bought at 125. Find the dividend and the cost of the stock.

4. A man bought government bonds, par value $500 each, at 108⅝, brokerage ⅛%, paying $8700 for them. How many did he buy?

5. A man received $38700 for city property, which had rented for 5% net of that sum, and invested the money in

6% Chicago city bonds at 7⅜% premium, brokerage ⅛%. How much is his yearly income increased or diminished ?

6. A man directed his broker to sell 125 shares of railroad stock at 8⅛% above par, and buy 100 shares of bank stock at 144⅞, brokerage in each case ⅛%, and sent him a sufficient sum to make the exchange. How much money did he send the broker ?

7. A sold 225 shares of 6% railroad stock at 95. He invested enough of the money in U. S. 5% bonds at par to give an annual income of $843.75 and gave his daughter the remainder of the money.

8. A man bought U. S. bonds at 90, on which he receives a quarterly income of 1¼%. To what annual rate of interest on the investment is it equal ?

9. Which will give the greater income, $10800 invested in 3% bonds at 25% discount, or the same amount invested in 8% bank stock at 144 ?

LESSON 33.

1. A man has an annual income of $384 from 6% railroad stock, which he bought at $94.25 a share. Find the cost of the stock.

2. A man receives a semi-annual dividend of two per cent on railroad stock which he bought at 120. What rate of interest does he receive on his money ?

3. The capital stock of a corporation is $500000. The gross income is $71728. The directors reserve $8500 for the surplus fund, pay expenses amounting to $15728, and distribute the remainder among the stockholders. What is A's dividend, if he owns 85 shares of the stock ?

4. A broker bought for a customer 45 shares of railroad stock at 143⅜, brokerage ⅛%. Find the cost.

5. A gas company with a capital of 5000 shares of $50 each declares a semi-annual dividend of 7%, after putting $6000 into the surplus fund. Find the gross earnings.

6. I bought bank stock at 187½ for $7500, on which I receive a dividend of 10%.

7. I sold 5% city bonds, on which I had received $380 annual interest, at 4½% premium. What did I receive for them?

8. Which is the more profitable, to invest money in 7% farm mortgages, or 10% bank stock at 160?

9. A man bought 100 shares of bank stock at $2\frac{1}{8}$% discount and sold it at par. How much did he gain?

TO THE TEACHER. — Teach 355 . . . 361.

LESSON 34.

1. Learn 355 . . . 361.

Raise the following to the powers indicated:

2. 24^2
3. 19^3
4. 6^4
5. $(3\frac{1}{2})^2$
6. $(\frac{3}{7})^4$
7. 38^3
8. $(.015)^3$
9. $(\frac{16}{25})^2$
10. 187^2
11. $(4\frac{3}{7})^3$
12. $(2.06)^3$
13. $(\frac{78}{91})^2$
14. $(1\frac{7}{9})^2$
15. $(4.9)^3$
16. 209^2
17. $(\frac{1}{37})^2$
18. $(30\frac{1}{4})^2$
19. $(3.75)^2$
20. $(\frac{1}{15})^3$
21. $(2.30\frac{1}{2})^2$

TO THE TEACHER. — Teach 362 . . . 371.

LESSON 35.

1. Learn 355 . . . 371.

Raise the following to the powers indicated:

2. 247^2
3. $(.009)^3$
4. $(\frac{1}{7})^4$
5. $(3\frac{5}{7})^2$
6. $(2.50\frac{1}{2})^2$
7. $(2.06)^2$
8. $(1\frac{1}{4})^4$
9. $(\frac{1}{11})^3$

Extract the square root of the following:

10. 1296
11. 3025
12. 5476
13. 2916
14. 2401
15. 6724
16. 9604
17. 5625

TO THE TEACHER. — Teach 371 . . . 373.

LESSON 36.

1. Learn 362 . . . 373.
2. What is the second power of 59 ?
3. What is the cube of $\frac{7}{9}$?
4. What is the square of $\frac{1}{15}$?
5. What is the third power of 4.5 ?

Extract the square root of the following:

6. 94249 7. 210681 8. 419904

Find the square root of the following to three decimal places:

9. .4 11. .6 13. .9
10. $4\frac{2}{3}$ 12. 2.5 14. 8.1

To the Teacher. — Teach 374 . . . 376.

LESSON 37.

1. Learn 362 . . . 376.
2. What is the square of 27 ? .05 ? $\frac{1}{9}$?
3. What is the third power of 24 ? 1.5 ?
4. Find one of the two equal factors of 18769.
5. Find one of the three equal factors of 15625.

Find the indicated roots of the following:

6. $\sqrt{811801}$ 7. $\sqrt{16892100}$ 8. $\sqrt[3]{389017}$
9. $\sqrt{\frac{36}{625}}$ 10. $\sqrt{7\frac{3}{4}}$ 11. $\sqrt{1.8}$ 12. $\sqrt[3]{.27}$
13. $\sqrt{\frac{2}{3}}$ 14. $\sqrt{.4}$ 15. $\sqrt[3]{\frac{1}{3}}$ 16. $\sqrt[3]{.001}$

To the Teacher. — Direct pupils how far to continue the work with those numbers that are not perfect powers.

LESSON 38.

1. Learn 362 . . . 376.
2. What is the fourth power of 5 ? $\frac{1}{2}$? .3 ?
3. What is the cube of .1 ? 7 ? $\frac{1}{3}$?
4. Find one of the three equal factors of 34328125.
5. Find one of the two equal factors of 212521.

6. Find the square root of .009 to 4 decimal places.

Find the indicated roots of the following:

7. $\sqrt{24403600}$ 8. $\sqrt[3]{27270901}$ 9. $(\frac{49}{225})^{\frac{1}{2}}$

10. $(\frac{2}{5})^{\frac{1}{2}}$ 11. $\sqrt{3\frac{1}{3}}$ 12. $\sqrt[3]{\frac{3}{7}}$

13. $\sqrt{4\frac{2}{5}}$ 14. $(16.5)^{\frac{1}{2}}$ 15. $(1.5)^{\frac{1}{3}}$

LESSON 39.

1. Learn 362 . . . 376.

2. What is the square of 45? 2.1? $\frac{1}{8}$?

3. What is the third power of .02? $\frac{1}{4}$?

Find the indicated roots of the following:

4. $\sqrt{258064}$ 5. $\sqrt{1166400}$ 6. $\sqrt[3]{14348907}$

7. $(\frac{1}{3})^{\frac{1}{2}}$ 8. $\sqrt{9\frac{3}{5}}$ 9. $\sqrt[3]{.8}$ 10. $\sqrt[3]{1\frac{4}{5}}$

11. $\sqrt{\frac{5}{7}}$ 12. $\sqrt{.025}$ 13. $(\frac{2}{3})^{\frac{1}{3}}$ 14. $\sqrt[3]{3.64}$

LESSON 40.

1. Learn 362 . . . 376.

2. What is the second power of $\frac{1}{15}$? .008?

3. What is the cube of $\frac{1}{4}$? .05? 1.2?

4. Find one of the two equal factors of 49984900.

5. Find one of the three equal factors of 44361864.

Find the indicated roots of the following:

6. $\sqrt{16224784}$ 7. $\sqrt{4.009}$ 8. $\sqrt[3]{.0125}$

9. $(1\frac{2}{7})^{\frac{1}{2}}$ 10. $\sqrt{\frac{4}{9}}$ 11. $(1.08)^{\frac{1}{3}}$

12. $\sqrt{\frac{3}{4}}$ 13. $\sqrt{1.1}$ 14. $(\frac{1}{9})^{\frac{1}{3}}$ 15. $\sqrt[3]{7\frac{3}{4}}$

LESSON 41.

1. Learn 362 . . . 376.

2. What is the square of .004? $\frac{1}{12}$? 35?

3. What is the third power of $1\frac{1}{2}$? .09? 2.2?

4. Find one of the three equal factors of 43614208.

Find the indicated roots of the following:

5. $\sqrt{396900}$ 6. $\sqrt{579121}$ 7. $\sqrt[3]{.0008}$

8. $(\frac{3}{5})^{\frac{1}{2}}$ 9. $\sqrt{.001}$ 10. $(8\frac{1}{8})^{\frac{1}{3}}$ 11. $\sqrt{\frac{1}{4}}$

12. $\sqrt{5\frac{1}{4}}$ 13. $\sqrt{16.25}$ 14. $\sqrt{\frac{5}{6}}$ 15. $(7.3)^{\frac{1}{3}}$

LESSON 42. 1. Learn 362 . . . 376.

2. What is the fourth power of $\frac{1}{3}$? .05? 12?

3. What is the cube of 2.5? $1\frac{1}{3}$? 33?

4. Find one of the two equal factors of 734449.

Find the indicated roots of the following:

5. $\sqrt{35892081}$ 6. $\sqrt[3]{4080659192}$ 7. $(27\frac{5}{8})^{\frac{1}{3}}$

8. $\sqrt{\frac{4}{11}}$ 9. $\sqrt{\frac{2}{7}}$ 10. $\sqrt{1.01}$ 11. $\sqrt[3]{12.64}$

12. $(6\frac{2}{3})^{\frac{1}{2}}$ 13. $\sqrt[3]{\frac{4}{7}}$ 14. $\sqrt{9.004}$ 15. $\sqrt[3]{.0014}$

LESSON 43. 1. Learn 322 . . . 328.

2. A man bought several bills of goods as follows March 2, $340, on 4 months' credit; March 16, $420, o 3 months' credit; April 28, $535, on 2 months' credit May 16, $660, on 4 months' credit. On what date could h equitably have paid the whole amount?

3. April 12 I bought goods for $1650 on 4 months credit. May 12 I paid $400; June 12, $500. On wha date should I have paid the remainder?

4. A merchant bought $300 worth of goods on months' credit, $400 worth on 3 months' credit, $500 wortl on 4 months' credit, and $800 worth on 6 months' credit If he bought the goods May 24, 1892, on what date coul he equitably have paid the whole amount?

5. I bought the following bills of goods on 90 days credit: Jan. 28, $175; Feb. 8, $218; Feb. 29, $245; Marcl 12, $325; March 28, $260; Apr. 14, $385. On what dat could I equitably have paid the whole amount?

6. Oct. 12 a merchant bought goods for \$1450 on 90 days' credit. If he paid \$600 on them at the time of purchase, when should he have paid the remainder?

7. What is the equated time for the payment of \$600, due in 15 days; \$560, due in 25 days; \$485, due in 30 days; \$365, due in 40 days; and \$295, due in 55 days, if all the terms of credit begin to-day?

8. A merchant has the following charges against a customer: Sept. 4, \$385, on 90 days' credit; Sept. 26, \$415, on 60 days' credit; Oct. 14, \$575, on 90 days' credit; Nov. 24, \$375, on 30 days' credit. Find the equated time for the payment of the whole amount.

LESSON 44. 1. Learn 322 . . . 328.

2. A owes B \$1500, payable in four equal parts, in 2, 4, 6, and 8 months respectively. On what date may he equitably pay the whole amount, if all the terms of credit begin to-day?

3. A merchant bought five bills of goods as follows: Apr. 6, \$480, on 4 months' credit; Apr. 26, \$395, on 3 months' credit; May 8, \$425, on 4 months' credit; May 29, \$365, on 5 months' credit; June 4, \$400, on 6 months' credit. What was the equated time for the payment of the whole account?

4. April 16 a merchant bought goods for \$1645 on 4 months' credit. June 16 he paid \$850. Find the equated time for the payment of the remainder of the bill.

5. What is the equated time for the payment of \$175, due to-day; \$245, due in 20 days; \$285, due in 30 days; \$335, due in 45 days; and \$485, due in 60 days?

6. A merchant sold the following bills of goods on 90 days' credit: May 2, \$260; May 14, \$335; May 26, \$440;

June 12, $295; June 22, $355; July 8, $285. On what date could he equitably have paid the whole amount?

7. May 8 a merchant bought goods for $1860, payable in 90 days. May 24 he paid $350; June 8, $400; June 22, $500. Find the equated time for the payment of the remainder.

8. May 16, 1892, a merchant bought a bill of goods amounting to $1600, payable as follows: $200 at the time of purchase, $300 in 1 month, $400 in 2 months, $400 in 3 months, and the remainder in 4 months. Find the equated time for the payment of the whole amount.

LESSON 45. 1. Learn 329 . . . 347.

Reduce the following ratios to their simplest form:

2. 4.6 : 5.06 3. $2\frac{3}{4}$ yd. : $7\frac{1}{3}$ in. 4. 3091 : 1405

5. ? : 12 :: $\frac{8}{9}$: $\frac{2}{3}$ 6. .7 : 1.4 :: ? : 5

7. How many bushels of berries will cost $16, if 16 quarts cost $1.28?

8. If 14 men can do a piece of work in 10 days, how many men can do $\frac{6}{7}$ of it in 8 days?

9. If 7 barrels of flour cost $33.25, how much will 45 barrels cost?

10. If 15 men can do a piece of work in 12 days, in how many days can double the number of men do three times as much work?

11. If .8 of a piece of land is worth $6800, how much is $\frac{11}{17}$ of it worth?

12. How high must a pile of wood be that is 80 ft. long and 4 ft. wide to be worth $71.25, if a pile 64 ft. long, 8 ft. wide, and 8 ft. high is worth $152?

13. If 32 men can do a piece of work in 45 days, in how many days can they perform the work with the assistance of 8 men more?

14. How many men can dig a ditch 15 rods long, $4\frac{1}{2}$ ft. wide, and 2 ft. deep, in 6 days of 6 hours each, if 16 men can dig a ditch 40 rods long, 6 ft. wide, and 3 ft. deep, in 18 days of 8 hours each?

LESSON 46.

1. Learn 329 . . . 347.

Find the value of the following ratios:

2. $7\frac{7}{11} : 10\frac{1}{2}$ **3.** 62.5 : .0025 **4.** \$31.64 : \$13.56

5. 781 : ? :: 561 : 459 **6.** 14 : 21 :: \$33.70 : ?

7. If 4 lb. 11 oz. of tea cost \$3.75, what is the price per pound?

8. What will be the interest of \$2250 for one year 8 months, if the interest of \$1500 for 2 years 5 months is \$217.50?

9. If a piece of oilcloth 5 ft. long and 4 ft. wide costs \$1.60, how many square yards will cost \$9?

10. In how many days can 12 men build 375 rods of fence, if 4 men can build 210 rods in $10\frac{1}{2}$ days?

11. On what sum will the interest amount to \$72, if the interest of \$965 for the same time at the same rate per annum is \$38.60?

12. How many men can do $\frac{5}{8}$ of a piece of work in 10 days, if 8 men can do the whole of it in 20 days?

13. How many days of 10 hours each must 9 men labor to do a piece of work that 6 men can do in 15 days, working 8 hours a day?

14. If 20 men can do a piece of work in 12 days, how many men may be withdrawn and the work finished in 15 days?

LESSON 47. **1.** Learn 329 . . . 347.

2. If $\frac{2}{3}$ of a lot of wool is worth $2173.50, what part of it is worth $1863?

3. If nine dozen pencils cost $1.80, how many gross can be bought for $30?

4. How many men can build 123 rods of wall in $20\frac{1}{2}$ days, if 5 men can build 60 rods in 16 days?

5. How many bushels of potatoes can be bought for $63, if 9 bushels cost $6.75?

6. In how many days can 20 men do four times as much work as 15 men can do in 16 days?

7. In how many days can 16 men do $\frac{3}{5}$ of a piece of work, if 20 men can do $\frac{7}{8}$ of it in 14 days?

8. If 15 men can do a piece of work in 9 days by working 9 hours a day, how many hours a day must 54 men work to do twice as much work in half the number of days?

9. Twenty-four men are engaged to do a piece of work in 15 days. After 5 days, 8 men stop work. In how many days can the rest finish the work?

10. If 9 men can build a wall 40 yd. long, 10 ft. high, and 9 ft. thick, in 90 days of 10 hours each, how many days of 9 hours each will 18 men require to build a wall 240 ft. long, 9 ft. high, and 5 ft. thick?

LESSON 48. Lesson 29, eighth grade, second term.

TO THE TEACHER. — **Teach 377 . . . 389. Teach these definitions with the greatest care, and be sure that pupils know what they mean.**

LESSON 49. 1. Learn 293 . . . 321.

2. The net earnings of a corporation having a capital of $1500000 are $105000. The company pays a quarterly dividend of 1½%. How much is added to the surplus?

3. I received $13632 from a sale of 5% railroad stock, sold at 96⅛, brokerage ⅛%, and invested the money in 8% bank stock at 141¾, brokerage ¼%.

4. A capitalist receives $3000 as the quarterly interest on 5% bonds. He bought the bonds at 4½% above par. How much did the bonds cost him?

5. If 6% stock is bought at 25% discount, what is the rate of income on the investment?

6. The capital stock of a telegraph company is $7500000. The total income in a year is $590631. The expenses are $228131, and the company pays 5% interest on a debt of $2000000. If A owns 350 shares of the stock, what will be his dividend?

7. A received $10080 for 3% stock, sold at 3¾% discount, brokerage ¼%, and invested the money in U. S. 5% bonds, at 104¾, brokerage ¼%. How much was his annual income increased or diminished?

8. A man bought some of the stock of a western railroad at 87½ and received $127.50, when a quarterly dividend of 1½% was declared. How much did the stock cost him?

9. What is the rate of interest on money invested in 7% railroad bonds, if bought at 20% premium?

10. Which will give the greater annual income, U. S. 4's at 107¼, purchased for $12900, or an investment of $10642.50 in 5% state bonds at 118, brokerage in each case ¼%?

To the Teacher. — **Teach 390 . . . 421.**

LESSON 50.

1. A man sold 250 shares of railroad stock at 12¾% discount, and invested enough of the proceeds in 6% Chicago city bonds at 105 to secure a semi-annual income of $420 and bought a house with the remainder. How much did he pay for the house?

2. A man has railroad stock on which he receives a quarterly dividend of 1¾%. If he bought the stock at 87½, what rate of interest does he receive on his investment?

3. A bank has a capital of $250000. The entire profits in a year are $41795, and the expenses $16895. If the directors pay as high an integral rate of dividend as possible, how much can they add to the surplus fund?

4. An insurance company invests a portion of its reserve fund in 5% state bonds at 4⅞% above par, brokerage ⅛%, and twice as much in 6% city bonds at 115¾, brokerage ¼%, investing $365400 in all. Find the yearly income from both investments.

5. If I buy 8% bank stock on which there is a semi-annual dividend of $600, what will it cost at $140 a share?

6. A man receives a quarterly income of 1½% on bonds bought at 4% above par. What is the annual rate of interest on the investment?

7. A man bought railroad stock at 16% premium, brokerage ⅛%, paying $5574 for it. How much is his dividend, if the stock pays 3½% semi-annually?

8. A sold several $1000 five per cent bonds, on which the quarterly interest was $275, at 108½, brokerage ¼%. How many bonds did he sell, and how much did he receive for them?

TO THE TEACHER. — Teach 422 . . . 427.

EIGHTH GRADE — THIRD TERM.

LESSON 1. 1. Learn 377 . . . 427.

2. How long is the hypotenuse of a right triangle whose base is 14 in. and whose perpendicular is 20 in.?

3. The perpendicular of a right triangle is 14 in. and the hypotenuse 25 in. Find the base.

4. How long is the edge of a cube whose volume is 2197 cubic inches?

5. How long is the side of a square whose area is 156.25 square rods?

6. How long is the diagonal of a rectangle which is 18 rods long and 12 rods wide?

7. The rafters of a building 40 ft. wide are 22 ft. long without the projection. How high is the ridge above the eaves?

8. What is the depth of a cubical bin that holds 40 bushels of wheat?

9. What is the perimeter of a square whose area is 56¼ square rods?

10. A building 40 ft. wide has the gable ends 10 ft. above the eaves. How long are the rafters, allowing that they project 18 inches on each side?

11. What is the diagonal of a square whose area is 320 square feet?

LESSON 2. 1. Learn 377 . . . 427.

2. The diagonal of a rectangle is 14 ft. and one side is 12 ft. Find the other dimension.

3. What is the entire surface of a cube whose volume is 729 cubic inches?

4. What is the diagonal distance through a cube seven inches on each edge?

5. Two persons start from the same place. One goes north at the rate of four miles an hour, and the other goes west at the rate of three miles an hour. How far apart will they be at the end of five hours?

6. The longest side of a right triangle is 12 ft., and one of the other sides is 8 ft. Find the length of the other side.

7. The area of a rectangle is 1440 square feet. What is the side of a square of equal area?

8. The two sides about the right angle in a right triangle are 40 ft. and 50 ft. How long is the other side?

9. How long must a cubical bin be made, inside measure, to hold as many bushels as one that is 32 ft. long, 16 ft. wide, and 8 ft. deep?

10. How long is the edge of a cube whose entire surface is 294 square inches?

11. What must be the length of a ladder to reach the top of a building 50 ft. high, the foot of the ladder being 20 ft. from the base of the building and in the same plane?

LESSON 3. 1. Learn 377 . . . 427.

2. The area of a square field is 10 acres. What is the distance from one corner to the opposite corner?

3. At 5½ cents a square foot, how much will it cost to line a cubical vat, the capacity of which is three barrels?

4. What is the distance from a lower corner to the opposite upper corner of a room 16 ft. long, 14 ft. wide, and 11 ft. high?

5. What is the length of the longest straight line that can be drawn on a rectangular sheet of paper 20 in. long and 15 in. wide?

6. The diagonal of a square is 14 inches. Find the dimension of the square.

7. How much will it cost to build a fence around a square field whose area is 40 acres, if the fence costs $1.25 a rod?

8. What was the length of a pole, standing 40 ft. from a building, the top of which, in falling, struck the building 50 ft. from the ground?

9. What are the dimensions of a cubical pile of wood containing 13½ cords?

10. The area of a square field is 10 acres. How long is each side?

11. Two sides of a right triangle are each 30 inches. How long is the other side?

LESSON 4. 1. Learn 377 . . . 427.

2. How long is the diagonal of a square whose area is 225 square inches?

3. A ladder 30 ft. long stands close against the side of a building. How far must the foot of the ladder be drawn out that the top may be lowered 5 ft.?

4. Find the volume of a cube whose entire surface is 384 square inches.

5. What is the distance from the top of a pole 60 ft. high to the top of a stake 8 ft. high, the two standing 100 ft. apart and in the same plane?

6. The longest straight line that can be drawn on a rectangular surface is 18 ft. and one dimension is 14 ft. Find the other dimension.

7. What are the inside dimensions of a cubical vat that will hold 1275 gallons of water?

8. How long is the diagonal through a cube 5½ inches on each edge?

9. What distance will a man travel in going diagonally across a rectangular field 60 rods wide and half a mile long?

10. A ladder 60 ft. long stands 12 ft. from a building, and the upper end rests against the building 6 ft. from the top. How high is the building?

11. How much will it cost, at 3 cents a square foot, to cement the bottom and sides of a cubical cistern, the capacity of which is 80 barrels?

LESSON 5. 1. Learn 377 . . . 427.

2. How long is the side of a square whose area is equal to the area of a rectangle 49 ft. long and 36 ft. wide?

3. What must be the length of a ladder to reach 8 ft. above the top of a building 40 ft. high, if the foot of the ladder is 16 ft. from the building?

4. The area of a square lawn is 9 sq. rd. What is the distance in feet from the center to each corner and to the middle of each side?

5. The base of a right triangle is 60 ft., and the hypotenuse is 110 ft. Find the length of the other side.

6. How many square inches are there in the surface of a cube whose volume is 1331 cubic inches?

7. Two railway trains start from the same point, and one goes south and the other west. The first goes twice as far as the second and goes 40 miles an hour. How far apart will they be at the end of 5 hours?

8. What must be the inside dimensions of a cubical bin to hold as many bushels as one that is 14 ft. long, 12 ft. wide, and 8 ft. deep?

9. What must be the width of a walk extending around a garden 100 ft. square to contain 1236 square feet, if the walk is outside the garden?

10. A post 12 ft. high stands in the center of a garden 200 ft. square. What is the distance from the top of the post to each corner of the garden?

11. The rafters of a building 50 ft. wide are 30 ft. long and project 2 ft. on each side. How high is the ridge above the eaves?

LESSON 6. 1. Learn 377 . . . 427.

2. What are the dimensions of a cube whose volume is 2744 cubic inches?

3. What are the dimensions of a square ceiling whose surface is 27 square yards?

4. What is the length of the longest straight line that can be drawn on a rectangular surface 16 ft. long and 3 yards wide?

5. The area of a square is 156 sq. in. What is the length of the longest straight line that can be drawn on it?

✓ 6. A pole 80 ft. long, standing between two buildings, one 70 ft. and the other 75 ft. high, will just reach the top of each without moving the foot. How far apart are the buildings?

7. What is the perimeter of a square whose area is $27\frac{9}{16}$ square feet?

8. A building 50 ft. wide has the gable ends 12 ft. high above the eaves. How long are the rafters, allowing that *they* project 18 in. on each side?

9. What must be the inside measure of a cubical bin to hold 400 bushels of corn?

10. If it costs $350 to inclose a rectangular field 80 rods long and 20 rods wide, how much will it cost to inclose a square field of the same area with the same kind of a fence?

11. How long a cord will reach from a lower corner to the opposite upper corner of a room 14 ft. square and 9 ft. high?

LESSON 7.

1. Learn 377 . . . 427.

2. A pole 40 ft. high stands in the center of a garden 100 ft. square. What is the distance from the top of the pole to each corner of the garden?

3. The longest straight line that can be drawn on a given square is 7 ft. What are the dimensions of the square?

4. The volume of a cubical stone is 2197 cubic inches. How many square feet are there in the surface?

5. How many cubic feet are there in a cubical stone whose entire surface is 1176 square inches?

6. A and B start from one corner of a section of land to go to the opposite diagonal corner. A goes around the section, and B goes diagonally across it and turns to meet A. If they travel at the same rate, how far from the corner will they meet?

7. What is the distance from the center to each corner and to the middle of each side of a square whose area is 25 square rods?

8. What are the outside dimensions of a cubical bin, made of inch boards, that will contain 25 bushels?

9. What must be the width of a walk extending around a garden 400 ft. square to occupy $\frac{1}{20}$ of the area?

10. What is diagonal distance through a cube whose surface is 384 square inches?

11. A straight pole 60 ft. long stands close against the side of a building. How far must the foot be moved away from the building that the top may be lowered 10 ft.?

To the Teacher. — Teach 428 . . . 430.

LESSON 8. 1. Learn 428 . . . 430.

2. Find the area of a triangle whose altitude is 16 ft. and whose base is 18 ft.

3. The area of a triangle is 234 square feet, and the base is 26 ft. What is the altitude?

4. What is the area of a triangle whose sides are 10, 12, and 14 ft. respectively?

5. Find the area of a triangle whose base is 4 rods 8 feet and whose altitude is 3 rods.

6. The area of a triangle is 44 square yards, and the altitude is 22 ft. What is the base?

7. How many acres are there in a triangular field whose sides are 16, 18, and 20 rods respectively?

8. At $1.50 a square foot, what is the value of a triangular piece of ground whose base is 76 ft. and whose altitude is 45 ft.?

9. One side of a triangle is 42 ft., and the perpendicular distance from the opposite angle to that side is 12½ ft. What is the area?

10. At $1.32 a square yard, it cost $19.80 to pave a triangular space the base of which was 18 ft. What was the altitude?

11. How many square feet are there in a triangular surface whose sides are 16, 20, and 22 ft. respectively?

LESSON 9. 1. Learn 428 . . . 430.

2. At \$22 a thousand feet, how much will it cost to board up the gable ends of a barn 40 ft. wide, the ridge being 14 ft. above the eaves?

3. A triangular piece of land contains $2\frac{1}{4}$ acres. The altitude is 24 rods. What is the base?

4. What is the area of an equilateral triangle each of whose sides is 14 feet?

5. The area of the gable end of a building is 250 square feet, and the building is 40 ft. wide. How high is the ridge above the eaves?

6. At \$2.50 a square rod, what is the value of a triangular piece of ground, one of whose sides is 32 rods and the perpendicular distance from the opposite angle to that side $18\frac{1}{2}$ rods?

7. At \$2.50 an acre, a man paid \$11.25 to have the grass in a triangular field cut. The altitude was 36 rods. What was the base?

8. The area of a triangular surface is 24 square yards, and the altitude is 18 ft. What is the base?

9. Find the area of an equilateral triangle, the sum of whose sides is 48 feet.

10. At 25 cents a square foot, what is the value of a triangular piece of stone whose base is 7 ft. and whose altitude is 5 ft. 8 in.?

11. What is the altitude of a triangle whose area is 4 square feet and whose base is 3 ft.?

12. What is the area of a triangle whose sides are 28, 32, and 36 ft. respectively?

TO THE TEACHER. — **Teach 431 and 432.**

LESSON 10. 1. Learn 431 and 432.

2. Find the area of a trapezoid whose parallel sides are 142 ft. and 116 ft. and whose altitude is 48 ft.

3. One side of a quadrilateral is 34 ft., the side opposite and parallel to it 28 ft., and the altitude 19 ft. How many square yards does it contain?

4. The parallel sides of a trapezoid are 14 ft. and 19 ft., and the altitude is 8 ft. What is its area?

5. The diagonal of a trapezium is 28 inches and the perpendiculars from the opposite angles 18 inches and 16 inches. What is the area?

6. At $125 an acre, what is the value of a piece of land in the form of a trapezoid, whose parallel sides are 60 rods and 40 rods, and whose altitude is 32 rods?

7. Find the area of a trapezoid whose parallel sides are 84 rods and 66 rods, and whose altitude is 38 rods.

8. One side of a quadrilateral is 4 ft., the side opposite and parallel to it 45 inches, and the distance between them 1 yard. Find the area.

9. The diagonal of a quadrilateral is 18 yards, and the perpendiculars from the opposite angles 18 ft. and 14 ft. Find its area.

LESSON 11. 1. Learn 431 and 432.

2. The parallel sides of a trapezoid are 24 rods and 18 rods and the distance between them 12 rods. What is its area?

3. Two of the fences inclosing a field run north and south and are 32 rods and 28 rods in length. The distance between them is 16 rods. Find the number of acres in the field.

4. Find the area of a trapezoid whose parallel sides are 62 yards and 48 yards and whose altitude is 68 feet.

5. Find the area of a quadrilateral whose diagonal is 18 ft., the perpendiculars from the opposite angles to the diagonal being 8 feet and 7 feet.

6. One side of a field is 28 rods, the side opposite and parallel to it 36 rods, and the distance between them 26 rods. How many acres are there in the field?

7. The parallel sides of a trapezoid are 18 yards and 34 feet and the altitude 26 feet. What is its area?

8. At $2.50 a square foot, what is the value of a piece of land in the form of a trapezoid, if the parallel sides are 16 yards and 34 feet and the distance between them 18 feet?

9. Find the area of a quadrilateral whose diagonal is 4 rods, the perpendiculars from the opposite angles to the diagonal being 6 yards and 22 feet.

10. Two of the boundary lines of a field run east and west and are 70 rods and 58 rods in length. The distance between these sides is 42 rods. Find the area in acres.

To the Teacher. — Teach 433 . . . 442.

LESSON 12. 1. Learn 433 . . . 442.

2. What is the circumference of a circle whose diameter is 16½ feet?

3. Find the area of a circle whose diameter is 4 ft.

4. What is the diameter of a circle whose circumference is 2 ft. 9 in.?

5. Find the area of a circle whose circumference is 72 ft.

6. Find the side of a square inscribed in a circle whose diameter is 14 inches.

7. What is the circumference of the largest circle that can be drawn on a sheet of paper 14 in. long and 9 in. wide?

8. What is the radius of a circle whose circumference is 16 rods?

9. What is the diameter of a circle whose area is 135 sq. ft.?

10. How large a square can be cut from a circular piece of paper 8 inches in diameter?

11. What is the circumference of a circle whose radius is 14 feet?

12. What is the area of a circle whose radius is 3½ ft.?

13. What is the diameter of a circle whose circumference is 17 yards?

LESSON 13. 1. Learn 433 . . . 442.

2. The distance around a circle is 2 rods. How many square feet does it contain?

3. How long is the side of a square inscribed in a circle one yard in diameter?

4. What is the length of a tire on a wheel 4 feet 9 inches in diameter?

5. How many acres are there in a circular field whose diameter is 22 rods?

6. What is the distance from the center of a circle to its circumference, the circumference being 18 ft. 3 in.?

7. The circumference of a circle is 125 yards. What is the area in square feet?

8. How much longer is the side of a square circumscribing a circle 2 ft. in diameter than the side of a square inscribed in the same circle?

9. What is the circumference of the largest circle that can be drawn on a board 14 inches square?

10. Find the radius in feet of a circle whose area is 7 square yards.

11. What is the area of a circle, if the distance around it is one mile?

12. What is the difference between the areas of two squares, one circumscribing a circle 8 ft. in diameter, and the other inscribed in the same circle?

LESSON 14.

1. Learn 433 . . . 442.

2. The diameter of a circle is 18 rods. What is the circumference?

3. What is the area of a semicircle whose diameter is 48 ft.?

4. What is the diameter of a circle whose circumference is 185 rods?

5. Find the side of a square inscribed in a circle whose diameter is one foot.

6. Which is greater, and how much, the circumference of a circle whose diameter is 16 ft. or the perimeter of a square whose side is 15 ft.?

7. What is the area of a circle whose radius is 50 yards?

8. What is the radius of a circle whose circumference is one mile?

9. If the area of a circle is 78.54 square feet, what is the radius?

10. The perimeter of a square and the circumference of a circle are each 200 feet. Which has the greater area?

11. Find the diameter of a circle whose area is 39.27 sq. rd.

12. What is the area of a circle whose circumference is 50 ft.?

LESSON 15. 1. Learn 433 . . . 442.

2. What is the perimeter of a square circumscribed about a circle whose area is 78.54 square feet?

3. What is the area of a semicircle whose radius is half a mile?

4. What is the diameter of a circle whose circumference is one rod?

5. How much longer is the side of a square circumscribing a circle 20 in. in diameter than the side of a square inscribed in the same circle?

6. The hind wheel of a carriage is $4\frac{1}{2}$ ft. high and revolves 1500 times in going a certain distance. If the fore wheel is $3\frac{1}{2}$ ft. high, how many times does it revolve in going the same distance?

7. If the circumference of a circle is 27 inches, what is the distance from the center to the circumference?

8. At $.85 a rod, what is the difference in the expense of fencing a circular field containing 10 acres and a square field of the same area?

9. The distance around a circular field is 100 rods. How many acres does it contain?

10. Which is greater, and how much, the circumference of a circle whose diameter is 24 rods or the perimeter of a rectangle 18 rods long and 16 rods wide?

11. Find the area of a circle whose diameter is $45\frac{1}{2}$ in.

LESSON 16. 1. Learn 433 . . . 442.

2. What is the radius of a circle whose circumference is 19 rods?

3. The perimeter of a square and the circumference of a circle are each 12 rods. Which has the greater area?

4. How many square yards are there in a semicircle whose diameter is 29 feet?

5. What is the diameter of a circle whose circumference is 22 feet 7½ inches?

6. How long is the side of a square inscribed in a circle 14 feet in diameter?

7. What is the circumference of the largest circle that can be drawn on a rectangle 29 inches wide?

8. Find the circumference of a circle whose area is ½ an acre.

9. The circumference of a circle is 17 yards. What is the area in square feet?

10. How many square feet are there in a circle whose radius is 15 yards?

11. The circumference of a circle is 12 rods 7 feet. How many square feet does it contain?

To THE TEACHER. — Teach 443 . . . 457.

LESSON 17. 1. Learn 443 . . . 457.

2. What is the convex surface of a cylinder whose circumference is 4½ ft. and whose altitude is 15 ft.?

3. What is the entire surface of a square prism the perimeter of whose base is 32 in. and whose altitude is 17 in.?

4. How many cubic inches are there in a cylinder whose diameter is 8 in. and whose altitude is 3 ft.?

5. What is the convex surface of a triangular prism the sides of whose base are 3, 4, and 5 ft. respectively and whose altitude is 12 ft.?

6. Find the entire surface of a cylinder whose diameter is 3 ft. and whose altitude is 14 ft.

7. How many cubic feet are there in a stick of timber 38 ft. long and 14 in. square at the ends?

8. What is the convex surface of a square prism the perimeter of whose base is 16 ft. and whose altitude is 18 ft.?

9. What is the volume of an equilateral triangular prism the perimeter of whose bases is 12 ft. and whose altitude is 22 ft.?

10. What will it cost, at $1.25 a square yard, to polish the convex surface of a granite cylinder 3 ft. in diameter and 14 ft. long?

LESSON 18. 1. Learn 443 . . . 457.

2. What is the entire surface of an equilateral triangular prism the perimeter of whose bases is 27 in. and whose altitude is 3 ft.?

3. What is the capacity of a cylindrical cistern the inside diameter of which is 8 ft. and whose depth is 14 ft.?

4. What is the entire surface of a square prism whose bases are 4 ft. square and whose altitude is 18 ft.?

5. Find the volume of a square prism the perimeter of whose base is 20 ft. and whose altitude is 42 ft.

6. What is the convex surface of a square prism whose base is 6 ft. on each side and the length of which is 18 ft.?

7. If a bin is 8 ft. square, how deep must it be to hold 140 bushels?

8. Find the entire surface of a cylinder whose circumference is 16 ft. and whose altitude is 25 ft.

9. What is the volume of a triangular prism the sides of whose bases are 2, 3, and 4 ft. respectively and whose altitude is 14 ft.?

10. What is the convex surface of an equilateral triangular prism each side of the base being 3 ft. and the altitude 5 yards?

11. What must be the depth of a cylindrical tank to hold 2 barrels of water, if it is 6 ft. in circumference?

To the Teacher. — Teach 458 . . . 465.

LESSON 19. **1.** Learn 458 . . . 465.

2. What is the convex surface of a cone the circumference of whose base is 16 ft. and whose slant height is 18 ft.?

3. What is the entire surface of a square pyramid the perimeter of whose base is 20 ft. and whose slant height is 19 ft.?

4. What is the volume of a square pyramid the perimeter of whose base is 8 ft. and whose altitude is 9 ft.?

5. What is the convex surface of a pyramid whose base is 8 ft. square and whose slant height is 24 ft.?

6. Find the entire surface of a cone the diameter of whose base is 3 ft. and whose slant height is 12 ft.

7. Find the volume of a cone the circumference of whose base is 9 ft. and whose altitude is 15 ft.

8. Find the convex surface of a cone the diameter of whose base is $3\frac{1}{2}$ ft. and whose slant height is 12 ft.

9. How many square yards are there in the entire surface of a rectangular pyramid whose base is 5 ft. long and 3 ft. wide and whose slant height is 18 ft.?

10. What is the volume of a pyramid whose base is 5 ft. square and whose altitude is 21 ft.?

11. What is the convex surface of a pyramid whose base is 6 ft. square and whose altitude is 15 ft.?

LESSON 20.

1. Learn 458 . . . 465.

2. What is the convex surface of a pyramid whose base is an octagon 4 ft. on each side and whose slant height is 40 ft.?

3. Find the entire surface of a cone the radius of whose base is 2 ft. 6 in. and whose slant height is 24 ft.

4. What is the volume of the largest cone that can be cut from a pyramid whose base is 5 ft. square and whose slant height is 18 ft.? How many cubic feet must be cut off to make the cone?

5. How many square yards are there in the convex surface of a cone the diameter of whose base is 4 ft. and whose slant height is 16 ft.?

6. What is the entire surface of an equilateral triangular pyramid the perimeter of whose base is 18 ft. and whose slant height is 28 ft.?

7. What is the volume of an equilateral triangular prism 12 ft. high, the sides of whose base are each 2 ft.?

8. How much will it cost, at 35 cents a square yard, to paint a church spire whose base is a hexagon 8 ft. on each side and whose slant height is 75 ft.?

9. What is the entire surface of a square pyramid the perimeter of whose base is 16 ft. and whose altitude is 17 ft.?

10. How many cubic yards are there in a cone the circumference of whose base is 20 ft. and whose altitude is 30 ft.?

To the Teacher. — Teach 466 . . . 471.

LESSON 21.

1. Learn 466 . . . 471.

2. What is the surface of a sphere whose diameter is 4 inches?

3. What is the volume of a sphere whose diameter is 17 inches?

4. Find the surface of a sphere whose circumference is one yard.

5. Find the volume of a sphere whose surface is 125 square feet.

6. What is the area of a sphere whose diameter is 2 feet?

7. How many cubic feet are there in a sphere whose surface is 30 square yards?

8. How many square feet are there in the surface of a sphere whose diameter is 17 inches?

9. Find the capacity of a hollow sphere the inside diameter of which is one yard.

10. What is the surface of a sphere whose circumference is 25 ft.?

11. The surface of a sphere is the same as that of a cube, the edge of which is 2 ft. Find the volume of each.

12. Find the area of a sphere whose diameter is 25 feet.

13. What is the volume of a sphere whose diameter is 9 inches?

LESSON 22. 1. Learn 377 . . . 432.

2. What was the length of a pole, standing 25 ft. from a building, the top of which, in falling, struck the building 30 ft. from the ground?

3. How many square yards are there in a triangle whose base is 72 ft. and whose altitude is 54 ft.?

4. The radius of a circle is 14 yards. What is the circumference?

5. What is the convex surface of a cylinder formed by the revolution of a rectangle about one of its sides, the rectangle being 12 ft. long and 8 ft. wide?

6. How many acres are there in a field in the form of a trapezoid, if the parallel sides are 24 rods and 16 rods and the distance between them 13 rods?

7. How long is the diagonal of a square whose area is 250 square feet?

8. How many square inches are there in the convex surface of a square pyramid whose base is 8 in. square and whose slant height is 2 feet?

9. Find the width and area of a rectangular plot of ground whose length is 20 rods and whose diagonal is 25 rods.

10. What is the volume of a cube whose entire surface is 121.5 square inches?

11. Find the side of a square inscribed in a circle whose diameter is 10 yards.

LESSON 23.

1. Learn 433 . . . 442.

2. What are the dimensions of a cubical pile of wood containing $21\frac{7}{16}$ cords?

3. A flag pole 60 ft. high stands in the center of a rectangular area 250 ft. long and 180 ft. wide. What is the distance from the top of the pole to each corner of the plot, to the middle of each side, and to the middle of each end?

4. At 35 cents a square yard, it cost $17.50 to have a triangular surface painted. If the base was 60 ft., what was the altitude?

5. Find the entire surface of a triangular prism the sides of whose base are 2, 3, and 4 ft. respectively and whose altitude is 16 ft.?

6. What is the area of a semicircle whose diameter is 18 feet?

7. What is the diagonal distance through a 12-inch cube?

8. Find the dimensions of a circle whose area is 40 square rods.

9. Find the entire surface of a cone the radius of whose base is 18 in. and whose slant height is 11 ft.

10. The circumference of a sphere is 18 in. What is the surface?

11. What are the dimensions of a square whose surface is 30.25 square inches?

LESSON 24. 1. Learn 443 . . . 457.

2. How much longer is the side of a square circumscribing a circle 4 ft. in diameter than the side of a square inscribed in the same circle?

3. What is the entire surface of a cube whose volume is 15625 cubic inches?

4. Two sides of a right triangle are each 25 feet. How long is the other side?

5. The sides of an equilateral triangle are each 18 rods. What is the area?

6. Which is greater, and how much, the circumference of a circle whose diameter is 3 rods or the perimeter of a rectangle 75 ft. long and 12 ft. wide?

7. The diagonal of a trapezium is 17 ft., and the perpendiculars from the opposite angles are 9 ft. and 6 ft. What is the area?

8. What is the longest straight line that can be drawn on a square whose area is 185 square inches?

9. Find the volume of the largest cone that can be cut from a cylinder 3 ft. in diameter and 18 ft. long. How many cubic feet must be cut from the cylinder to make the cone?

10. The longest side of a piece of land in the form of a right triangle is 70 rods, and one of the other sides is 48 rods. Find the third side and the area of the triangle.

11. If it cost $120 to inclose a square field containing 10 acres, how much will it cost to inclose a circular field of the same area with the same kind of fence?

To the Teacher. — Teach 472 . . . 478.

LESSON 25. 1. Learn 458 . . . 471.

2. How large a square can be cut from a circular sheet of tin plate 27 in. in diameter?

3. What must be the inside dimensions of a cubical cistern to hold as many barrels of water as one that is 12 ft. long, 8 ft. wide, and 6 ft. deep?

4. Two men start from one corner of a rectangular field 70 rods long and 50 rods wide to go to the opposite corner. One goes around the field. The other goes diagonally across it and turns to meet the first. How far from the corner will they meet, if they travel at the same rate?

5. At $.175 a square yard, how much will it cost to pave a triangular space, one of whose sides is 120 yards and the perpendicular distance from the opposite angle to that side 270 ft.?

6. A wheel 4 ft. 6 in. in diameter revolves 2200 times in going a certain distance. How many revolutions will another wheel make in going the same distance, if it is 3 ft. 2 in. high?

7. How many bushels will a bin hold that is 18 ft. square and 8 ft. deep?

8. Find the circumference of a circle whose area is ¾ of an acre.

9. What is the convex surface of a cone the diameter of whose base is 6 ft. and whose altitude is 24 ft.?

10. Find the cubic contents of a sphere whose circumference is 16 feet.

11. What are the dimensions of a square whose area is equal to the area of a rectangle 47 ft. long and 28 ft. wide?

To the Teacher. — Teach 472 . . . 478.

LESSON 26. **1.** Learn 472 . . . 478.

2. The difference in time between two places is 5 hr. 4 min. Find the difference in longitude.

3. The difference in longitude between two places is 65° 20′ 15″. What is the difference in time?

4. When it is 11 o'clock A.M. at one place, what is the time at a place east of it, the difference in time being 2 hr. 40 min.?

5. The difference in time between two places is 2 hr. 15 min. 12 sec. What is the difference in longitude?

6. The difference in longitude between two places is 87° 45′. What is the difference in time?

7. The difference in time between two places is 3 hr. 25 min. When it is 30 min. past. 1 P.M. at the easterly place, what is the time at the other place?

8. The longitude of Philadelphia is 75° 10′ west and that of St. Paul 93° 4′ 55″ west. When it is 15 min. past 1 P.M. at Philadelphia, what is the time at St. Paul?

9. What is the longitude of a place whose time is 20 min. 40 sec. past 8 P.M. when it is midnight at Greenwich?

10. The longitude of Canton is 113° 14′ east. When it is 45 min. past 10 A.M. at Greenwich, what is the time at Canton?

11. When it is noon at Boston, it is 34 min. 29 sec. past 8 A.M. at San Francisco. The longitude of Boston is 71° 3′ 30″ west. What is the longitude of San Francisco?

LESSON 27. 1. Learn 472 . . . 478.

2. The difference in time between two places is 6 hr. 8 min. 20 sec. What is the difference in longitude?

3. The difference in longitude between two places is 72° 18′ 24″. What is the difference in time?

4. The difference in time between two places is 5 hr. 45 min. When it is 45 min. past 3 P.M. at the easterly place, what is the time at the westerly place?

5. What is the difference in time between Greenwich and a place 95° 16′ east of it? Which has the earlier time?

6. The difference in time between two places is 9 hr. 45 min. What is the difference in longitude?

7. When it is 11 o'clock A.M. at New York it is 5 min. 21 sec. past 4 P.M. at Paris. The longitude of New York is 74° 3″ west. What is the longitude of Paris?

8. The difference in longitude between two places is 62° 15′ 40″. When it is 25 min. past 10 A.M. at the westerly place, what is the time at the other place?

9. The difference in time between two places is 4 hr. 10 min. When it is 10 o'clock A.M. at the westerly place, what is the time at the other place?

10. The longitude of Philadelphia is 75° 10″ west. When it is 10 o'clock A.M. at Philadelphia, it is 10 min. past 3 P.M. at Paris. What is the longitude of Paris?

11. The longitude of New York is 74° 3″ west and that of Paris 2° 20′ 12″ east. When it is 20 min. 40 sec. past 9 A.M. at New York, what is the time at Paris ?

LESSON 28. **1.** Learn 472 . . . 478.

2. The difference in longitude between two places is 58° 20′ 45″. What is the difference in time ?

3. What is the difference in longitude between two places, if the difference in time is 7 hr. 8 min. 18 sec. ?

4. The difference in time between two places is 8 hr. 10 min. 40 sec. What is the difference in longitude ?

5. What is the difference in time between Greenwich and a place 120° 40′ 15″ west of it ? Which has the earlier time ?

6. What is the longitude of a place whose time is 40 min. 20 sec. past 3 P.M. when it is noon at Greenwich ?

7. The longitude of Cincinnati is 84° 26′ west and that of Berlin 13° 23′ 45″ east. When it is 20 min. 30 sec. past 9 A.M. at Cincinnati, what is the time at Berlin ?

8. The difference in time between two places is 10 hr. 15 min. When it is 35 min. past 4 P.M. at the easterly place, what is the time at the other place ?

9. The longitude of Boston is 71° 3′ 30″ west and that of San Francisco 122° 26′ 15″ west. When it is noon at Boston, what is the time at San Francisco ?

10. When it is 30 min. past 2 P.M. at Berlin, it is 58 min. 41 sec. past 7 A.M. at Cincinnati. The longitude of Berlin is 13° 23′ 45″ east. What is the longitude of Cincinnati ?

11. The difference in longitude between two places is 84° 16′ 20″. When it is 40 min. 20 sec. past 3 P.M. at the easterly place, what is the time at the other place ?

LESSON 29. 1. Learn 377 . . . 432.

2. How much larger is a square circumscribing a circle one rod in diameter than one inscribed in the same circle?

3. How large must a cubical cistern be made to hold 200 barrels of water?

4. Two persons start from the same point. One goes south and the other east. The first goes twice as far as the second and goes 12 miles a day. How far apart will they be at the end of six days?

5. The area of a triangle is 5½ acres, and the altitude is 40 rods. What is the base?

6. What is the area of a semicircle whose radius is 27 inches?

7. One side of a quadrilateral is 2 yards, the side opposite and parallel to it is 5 ft., and the distance between them is 45 inches. What is the area?

8. What is the area of a circle, if the distance around it is 314.16 feet?

9. What part of the volume of a cylinder must be cut away to make a cone?

10. Find the dimensions and area of a square field whose diagonal is 35 rods.

11. What is the perimeter of a square circumscribed about a circle whose area is one acre?

LESSON 30. 1. Learn 433 . . . 442.

2. A rectangular park 80 rods long and 60 rods wide has a walk running diagonally through it. How long is the walk?

3. How many square yards are there in a triangular surface whose sides are 28, 24, and 20 ft. respectively?

4. What is the circumference of the largest circle that can be drawn on a paper 45 inches square?

5. At 12 cents a square foot, what is the value of enough tin plate to make 400 ft. of 8-in. pipe?

6. The area of a square garden is 42 square rods. What is the distance in feet from the center to each corner and to the middle of each side?

7. What will it cost, at 45 cents a square yard, to paint a church spire whose base is an octagon 7 ft. on each side and whose slant height is 95 ft.?

8. What is the surface of a sphere whose diameter is one foot?

9. What is the perimeter of a square field whose area is 4 acres?

10. A pyramid 80 ft. high has a base 40 ft. long and 30 ft. wide. What is the distance from the top of the pyramid to each corner of the base and to the middle of each side?

11. One side of a triangle is 150 ft., and the perpendicular distance from the opposite angle to that side is 96 ft. What is the area?

LESSON 31. 1. Learn 443 . . . 457.

2. What is the length of a cord that will reach from a lower corner to the opposite upper corner of a room 18 ft. long, 15 ft. wide, and 12 ft. high?

3. At $2.25 a rod, what is the difference in the expense of fencing a circular field containing 22 acres and a square field of the same area?

4. What is the entire surface of an equilateral triangular pyramid the perimeter of whose base is 12 ft. and whose slant height is 13 ft.?

5. A pole 80 ft. long stands 10 ft. from a building, and the upper end rests against the building 10 ft. from the top. How high is the building?

6. A square lawn has a walk of uniform width extending around it. The area of the walk is 16400 square feet, and the entire distance around the walk is 1680 ft. How wide is the walk?

7. How long is the side of a square inscribed in a circle whose area is 75 square feet?

8. What is the altitude of a triangle whose area is 216 square inches and whose base is 2 feet?

9. What is the area of a circle whose diameter is 40 feet?

10. What is the volume of a triangular prism, each side of the base being 4 ft. and the altitude 18 ft.?

11. The parallel sides of a trapezoid are 22 rods and 86 rods, and the distance between them 18 rods. Find the area in acres.

To the Teacher. — Teach 479 . . . 485

LESSON 32. 1. Learn 458 . . . 471.

2. How many square feet are there in a circle whose circumference is 27½ yards?

3. What is the volume of a sphere whose surface is 25 square yards?

4. How much longer is the perimeter of a square circumscribing a circle 5 ft. in diameter than that of one inscribed in the same circle?

5. At 12 cents a square foot, how much will it cost to line the bottom and sides of a cubical vat with zinc, the *capacity* of the vat being 15 barrels?

6. What is the area of an equilateral triangle whose perimeter is 72 feet?

7. What is the convex surface of a cylinder the circumference of whose base is $10\frac{1}{2}$ ft. and whose altitude is 23 ft.?

8. What is the diagonal distance in inches through a cubical block of granite whose surface is 6 square yards?

9. The area of a square piece of paper is 148 square inches. What is the length of the longest straight line that can be drawn on it?

10. How many cubic inches are there in a square pyramid the perimeter of whose base is 4 ft. 8 in. and whose altitude is 2 ft. 7 in.?

11. The entire surface of a cube contains 726 half-inch squares. What is the volume of the cube?

TO THE TEACHER. — Teach 486 . . . 496.

LESSON 33.

1. Learn 479 . . . 496.

2. Reduce 476^{Km} to miles.

3. Reduce 38^{l} to gallons.

4. Reduce $18\frac{3}{4}$ yards to meters.

5. Reduce 1962 cubic yards to cubic meters.

6. Reduce 245 square yards to square meters.

7. What is the weight in grams of $14.6^{cu\ dm}$ of water?

8. Reduce 65^{Kg} to pounds Avoirdupois.

9. Express 9465^{m} as centimeters; as hektometers.

10. How many square decimeters are there in a piece of paper 24^{m} long and 1.4^{m} wide?

11. If a piece of paper is 8^{dm} wide, how long must it be to contain $2.4^{sq\ Dm}$?

12. How many cubic meters of air are there in a room 6^{m} long, 4^{m} 6^{dm} wide, and 3^{m} high? How many liters?

LESSON 34.

1. Learn 479 . . . 496.

2. Reduce $8^{m}\ 6^{dm}$ to feet.

3. Reduce 216 square rods to ares.

4. Reduce 22 gallons 3 quarts to liters.

5. How many meters are there in 42 feet?

6. Express $5^{Km}\ 3^{Dm}\ 4^{m}\ 6^{cm}$ as meters.

7. Find the weight in kilograms of a cubic hektoliter of water.

8. Reduce 218 pounds Avoirdupois to kilograms.

9. Find the weight in grams of a cubic foot of water.

10. A pan is 1^{m} long and 4^{dm} wide. How deep must it be to contain 90^{l}?

11. How many hectares are there in a piece of land 4.2^{Hm} long and 9.8^{Dm} wide? How many acres?

12. How many liters of water will a vat hold that is 3^{m} long, $1^{m}\ 8^{dm}$ wide, and $9^{dm}\ 8^{cm}$ deep? How many hektoliters? Find the weight of the water in kilograms.

LESSON 35.

1. Learn 479 . . . 496.

2. Reduce 4^{Dm} to inches.

3. Reduce 8^{Dg} to grains.

4. Reduce 24.8^{Hl} to bushels.

5. Reduce 2 mi. 40 rd. to kilometers.

6. Reduce 948 cu. ft. to cubic meters.

7. Reduce 138 A. 80 sq. rd. to hectares.

8. Express $875.42^{sq\,m}$ as ares; as square centimeters.

9. Find the weight in decigrams of a dekaliter of water.

10. If a piece of land is 25^{Dm} wide, how long must it be to contain 20 hectares?

11. How many centares are there in a sidewalk 1.75^{Km} long and 1.8^{m} wide? How many ares?

12. How many hektoliters of wheat will a bin hold that is 5^{m} long, 3^{m} 6^{dm} wide, and 2.6^{m} deep? How many kilograms of water?

LESSON 36.

1. Learn 479 . . . 496.
2. Reduce 75^{Hm} to rods.
3. Reduce 100 rods to meters.
4. Express 65^{Hl} 6^{l} 54^{cl} as liters.
5. Reduce 68 bu. 3 pk. to hektoliters.
6. Reduce 4 lb. 12 oz. Avoirdupois to grams.
7. How many kilograms are there in a cubic yard of water?
8. How many acres are there in a field 8.2^{Hm} long and 48^{Dm} wide?
9. How many square meters are there in a piece of paper 18 yd. long and 4 ft. wide?
10. A bin holds 36^{Hl} of wheat. If it is 4^{m} long and 3^{m} wide, how many decimeters deep is it?
11. How many decigrams of water will a pan hold that is 1^{m} long, 6^{dm} wide, and 2.5^{dm} deep?
12. At $2 a stere, what is the value of a pile of wood 24^{m} long, 2^{m} 6^{dm} wide, and 1.8^{m} high? Find the value at $6 a cord.

LESSON 37.

1. Learn 479 . . . 496.
2. Reduce 86 cu. ft. to liters.
3. Reduce 1 mi. 80 rd. to dekameters.
4. Reduce 255^{Hg} to ounces Avoirdupois.
5. Reduce 75.45^{Km} to miles, rods, and feet.

6. Express 42.8$^{\text{cu m}}$ as liters; as hektoliters.

7. Find the number of liquid pints in a dekaliter.

8. The area of a walk is 126$^{\text{sq m}}$. If it is 9$^{\text{dm}}$ wide, how long is it?

9. How many ares are there in a garden 15 rd. long and 55 ft. wide?

10. How many square feet are there in a piece of paper 4.8$^{\text{Dm}}$ long and 1.75$^{\text{m}}$ wide?

11. How many hektoliters of water will a cistern hold that is 4.2$^{\text{m}}$ long, 3$^{\text{m}}$ wide, and 2$^{\text{m}}$ 8$^{\text{dm}}$ deep? How many gallons? How many kilograms?

LESSON 38.

1. Reduce 18 pwt. to centigrams.

2. Express 3$^{\text{Ha}}$ 16$^{\text{a}}$ 52$^{\text{ca}}$ as hectares.

3. Find the weight in grams of 864 cu. in. of water.

4. How many liters are there in 36 gal. 2 qt. of water?

5. Reduce 42 mi. to kilometers, hektometers, and meters.

6. How many hectares make a section of land?

7. What must be the length of a box 1$^{\text{m}}$ wide and 1$^{\text{m}}$ deep to contain 3800$^{\text{l}}$?

8. How many square rods are there in a garden 1$^{\text{Hm}}$ long and 8.5$^{\text{Dm}}$ wide?

9. Find the weight in kilos of 285$^{\text{cu dm}}$ of mercury, assuming that it is 13.5 times as heavy as water.

10. Each dimension of a cubical bin is 4.8$^{\text{m}}$. How many hektoliters of oats will it hold? How many bushels?

LESSON 39.

1. Reduce 25 rods to decimeters.

2. Reduce 85$^{\text{Hg}}$ to pounds Troy.

3. A cubic yard is what part of a cubic meter?

4. Reduce 58^{Hl} to bushels, pecks, and quarts.

5. Express 7438^{mg} as grams; as kilograms.

6. How many dekagrams does a hektoliter of water weigh?

7. A square field contains 100^{Ha}. Find each dimension in meters.

8. At $7.50 a cord, what is the value of a pile of wood 6^{Dm} long, 3^{m} wide, and 1.5^{m} high?

9. How many square inches are there in a piece of paper 9.4^{m} long and 8.5^{dm} wide?

10. How many centares are there in a floor 78 ft. long and 56 ft. wide?

LESSON 40.

1. Reduce 14 lb. Avoirdupois to dekagrams.

2. How many kilometers make a mile?

3. Reduce 48 bu. 4 qt. to hektoliters.

4. Express 5^{Km} 16^{Dm} 14^{m} 7^{cm} as meters.

5. Find the number of square dekameters in a garden 20 rods square.

6. Find the weight in grams of $15^{cu\ m}$ of water.

7. How many acres are there in a field 7.8^{Hm} long and 36^{Dm} wide? How many hectares?

8. What must be the length of a pile of wood 2^{m} wide and 1.25^{m} high to contain 24^{st}?

9. How many hektoliters of air are there in a room 7.2^{m} long, 5^{m} 8^{dm} wide, and 3.2^{m} high?

10. Find the weight in kilograms of a cubic foot of gold, assuming that gold is $19\frac{1}{4}$ times as heavy as water.

LESSON 41. 1. Learn 377 . . . 432.

2. How large a square stick of timber can be sawed from a log 17 inches in diameter at the smaller end?

3. The volume of a cubical stone is 64000 cubic inches. How many square inches are there in the entire surface of the stone?

4. A pole 80 ft. high stands 200 ft. from a post 10 ft. high. What is the distance from the top of one to the top of the other?

5. At $240 an acre, what is the value of a triangular piece of land, one of whose sides is 46 rods and the perpendicular distance from the opposite angle to that side 32 rods?

6. How long a band of iron will encircle a cylindrical tank 14 ft. 6 in. in diameter?

7. The diagonal of a quadrilateral is 2 rods, and the perpendiculars from the opposite angles are 4 yards and 11 feet. Find the area.

8. What is the radius of a circle whose area is 155 square feet?

9. Find the convex surface of an equilateral triangular pyramid the sides of whose base are each 7 ft. and whose slant height is 21 ft.

10. How many square yards are there in the surface of a sphere whose circumference is 4 feet?

11. At 45 cents a square yard, how much will it cost to line the bottom and sides of a cubical bin, the capacity of which is 2000 bushels?

LESSON 42. 1. Learn 433 . . . 442.

2. Two men start from one corner of a field 80 rods square to go to the opposite corner. A goes around the field. B goes diagonally across it and turns to meet A. *How* far from the corner will they meet, if they travel at *the same rate?*

3. The area of a triangle is 48 square yards, and the base is 36 ft. What is the altitude?

4. How many square feet are there in a circle whose radius is 2 rods?

5. What is the entire surface of an equilateral triangular pyramid the sides of whose base are 5 ft. and whose slant height is 15 ft.?

6. I bought a piece of land in the form of a trapezoid, whose parallel sides were 24 rods and 19 rods and whose altitude was 8 rods, paying $240 an acre.

7. The perimeter of a square and the circumference of a circle are each 60 ft. Which has the greater area, and how much?

8. Find the entire surface of a square pyramid the perimeter of whose base is 12 ft. and whose altitude is 7 ft.

9. The longest straight line that can be drawn on a rectangular floor is 28 ft., and one dimension is 21 ft. Find the other dimension.

10. If it cost $225 to inclose a rectangular field 50 rods long and 40 rods wide, how much will it cost to inclose a square field of the same area with the same kind of a fence?

11. How much larger is a square circumscribing a circle 12 ft. in diameter than one inscribed in the same circle?

LESSON 43. 1. Learn 443 . . . 457.

2. How many square feet are there in a triangular surface whose sides are 56, 52, and 48 inches respectively?

3. A wheel 5 ft. 9 in. high revolves 4000 times in going a certain distance. How many revolutions will another wheel make, which is 3 ft. 8 in. high, in going the same distance?

4. How deep must a cylinder be to hold half a bushel, if it is 8 in. in diameter?

5. What is the distance from a lower corner to the opposite upper corner of a room 16 ft. square and 10 ft. high?

6. What is the distance from the center to each corner and to the middle of each side of a square whose area is 6 acres?

7. What is the volume of the largest pyramid that can be cut from a prism 4 ft. square and 8 ft. long? How many cubic feet must be cut from the prism to make the pyramid?

8. How many cubic inches are there in a sphere one foot in diameter?

9. If it cost $320 to inclose a square garden containing 2½ A., how much will it cost to inclose a circular field of the same area with the same kind of a fence?

10. What must be the inside dimensions of a cubical vat to hold 4000 gallons?

11. A building 30 ft. wide has the gable ends 8 ft. above the eaves. How long are the rafters, if they project one foot on each side?

LESSON 44. 1. Learn 458 . . . 471.

2. What is the area of a semicircle whose radius is 17½ yards?

3. How many square inches of paper will be required to cover the convex surface of an equilateral triangular prism, each side of whose base is 9 in. and whose altitude is 3 ft.?

4. Find the area of a quadrilateral whose diagonal is 6 rods, the perpendiculars from the opposite angles to the diagonal being 14 yards and 38 feet.

5. What are the dimensions of a circle whose area is 66 square yards?

6. What is the convex surface of a pyramid whose base is 4 ft. square and whose altitude is 20 ft.?

7. The longest straight line that can be drawn on a given square is 14 feet. Find the area of the square.

8. What is the perimeter of a square circumscribed about a circle whose area is 25 square yards?

9. What is the outside length of a cubical bin, made of 2-inch lumber, that holds 1400 bushels?

10. If it requires 330 feet of lumber to board up the gable ends of a barn 30 ft. wide, how high is the ridge above the eaves?

11. Which is greater, and how much, the perimeter of a rectangle 18 yd. long and 35 ft. wide, or the circumference of a circle whose diameter is 15 yards?

LESSON 45. 1. Learn 479 . . . 496.

2. How many feet are there in 86^{dm}?

3. How many pennyweights are there in 35^{Hg}?

4. How many meters are there in 135 yards?

5. Reduce 1245 cu. ft. to hektoliters.

6. Reduce 1245 acres to square hektometers.

7. Reduce 37^{Dl} to gallons, quarts, and pints.

8. Express 1472.35^{m} as kilometers; as millimeters.

9. How many kilos does a cubic dekameter of water weigh?

10. How many centares are there in a sidewalk 2.4^{Km} long and 2.2^{m} wide?

11. How many cords are there in a pile of wood 4^{Dm} long, 3.5^{m} wide, and 2^{m} high?

12. How many brick 20^{cm} long and 10^{cm} wide will it take to pave a sidewalk 2.4^{m} wide and 1.4^{Km} long?

LESSON 46.

1. Learn 479 . . . 496.

2. How many hektometers make a rod?

3. Reduce 145 pounds Avoirdupois to hektograms.

4. Find the number of deciliters in a gallon.

5. Reduce 46.025^{Km} to miles, rods, and yards.

6. Find the weight in grams of 245 cu. in. of water.

7. How many square feet are there in a piece of paper $3^{Dm}\,6^{m}$ long and $1^{m}\,4^{dm}$ wide?

8. A block of wood contains $960000^{cu\,cm}$. If it is 8^{dm} wide and 6^{dm} thick, what is the length in meters?

9. How many hektoliters of water will a cistern hold that is 5^{m} long, $3^{m}\,8^{dm}$ wide, and 3.2^{m} deep? How many gallons? How many kilograms?

10. At $.45 a centare, how much will it cost to plaster the walls and ceiling of a room 22 ft. long, 18 ft. wide, and 10 ft. high, allowing $15^{sq\,m}$ for openings?

LESSON 47.

1. Learn 479 . . . 496.

2. How many yards are there in 6^{dm}?

3. Reduce 2500^{Dg} to ounces Avoirdupois.

4. How many dekameters make a mile?

5. How many bushels make a hektoliter?

6. What part of a cubic meter is a cubic foot?

7. How many square yards are there in the ceiling of a room $9^{m}\,8^{dm}$ long and $6^{m}\,4^{dm}$ wide?

8. At $48.75 an are, find the value of a piece of ground 250 ft. long and 75 ft. wide.

9. Each dimension of a cubical bin is 3.8^{m}. How many hektoliters of corn will it hold? How many bushels? How many kilograms of water?

10. A rectangular piece of ground is 65.4^{m} long wide. Find the cost of inclosing it with a walk 1^{m} [illegible] wide at $.35 a square meter; first, when the walk is outside the ground; second, when the walk is part of the ground.

LESSON 48.

1. Learn 479 . . . 496.

2. How many miles are there in 9^{Hm}?

3. Reduce 8 oz. 16 pwt. to decigrams.

4. How many decimeters make a rod?

5. How many dekaliters make a bushel?

6. Find the weight in hektograms of a dekaliter of water.

7. How many kilograms are there in 4 cu. yd. 9 cu. ft. of water?

8. At $375 a hectare, how much will three square miles of land cost?

9. The capacity of a tank is $60^{cu\,m}$. How long will it take a pipe to fill it at the rate of 3.8^{Dl} a minute?

10. How long must a stick of timber be that is 2.5^{dm} square at the ends to contain $.625^{cu\,m}$?

11. How many square yards of plastering are there in the walls and ceiling of a room 8^{m} long, 6^{m} wide, and 4^{m} 4^{dm} high, no allowance being made for openings?

LESSON 49.

1. Learn 377 . . . 442.

2. What is the entire surface of a cylinder whose diameter is 3 ft. and whose altitude is 28 ft.?

3. Two of the boundary lines of a field run north and south and are 80 rods and 68 rods in length. The distance between them is 58 rods. Find the number of acres in the field.

4. What is the area of a circle, if the distance around it is 4 rods?

5. What is the entire surface of a cone the circumference of whose base is 15.708 ft. and whose altitude is 21 ft.?

6. If the diameter of the earth were exactly 8000 miles, what would be its surface?

7. At $2 a rod, how much will it cost to inclose a square field containing six acres?

8. Find the side of a square inscribed in a circle whose diameter is 6½ ft.

9. What is the length of the longest straight line that can be drawn on the floor of a room 18 ft. long and 14 ft. wide?

10. How many square yards are there in an equilateral triangle whose perimeter is 144 ft.?

11. What is the area of a circle whose diameter is 100 feet?

LESSON 50. 1. Learn 443 . . . 471.

2. If a bin is 18 ft. long and 10 ft. wide, how deep must it be to hold 500 bushels?

3. What is the greatest distance between any two points in a room 12 ft. long, 9 ft. wide, and 8 ft. high?

4. What is the length of the longest straight line that can be drawn on a square whose area is 15 square yards?

5. What part of the volume of a square prism must be cut away to make a square pyramid?

6. A ladder 56 ft. long will just reach the top of a building 52 ft. high. Without moving the foot, it will reach the top of another building 50 ft. high on the opposite side. What is the distance between the buildings?

7. The surface of a sphere is the same as that of a cube the edge of which is one yard. How many cubic feet are there in each?

8. What must be the width of a walk extending around a garden 300 ft. square to occupy half the area?

9. What is the perimeter of a square circumscribed about a circle whose area is 7854 square rods?

10. At 8 cents a square foot, how much will it cost to line the bottom and sides of a cubical bin the capacity of which is 125 bushels?

11. What is the circumference of the largest circle that can be drawn on a rectangle 8 feet 6 inches wide?

DEFINITIONS, PRINCIPLES, AND RULES.

1. **A Unit** is a single thing.

2. **A Number** is a unit or a collection of units.

3. **The Unit of a Number** is one of that number.

4. **An Abstract Number** is a number used without reference to any particular thing or quantity.

5. **A Concrete Number** is a number used with reference to some particular thing or quantity.

6. **Like Numbers** are numbers that express units of the same kind.

7. **Unlike Numbers** are numbers that express units of different kinds.

8. Numbers are expressed by words, by figures, or by letters.

9. **Notation** is the method of expressing numbers by figures or by letters.

10. **The Arabic Notation** is the method of expressing numbers by figures.

11. **The Roman Notation** is the method of expressing numbers by letters.

12. **Numeration** is the method of reading numbers expressed by figures.

13. When figures are written side by side, the figure at the right expresses *ones, which are called units of the first order.*

14. A figure in the second place expresses *tens, which are called units of the second order.*

15. A figure in the third place expresses *hundreds, which are called units of the third order.*

16. A figure in the fourth place expresses *thousands, which are called units of the fourth order.*

17. A figure in the fifth place expresses *ten-thousands, which are called units of the fifth order.*

18. A figure in the sixth place expresses *hundred-thousands, which are called units of the sixth order.*

19. A figure in the seventh place expresses *millions, which are called units of the seventh order.*

20. A Period is a group of three orders of units, counting from right to left.

21. RULE FOR NOTATION. — *Begin at the left and write the hundreds, tens, and units of each period in succession, filling all vacant places and periods with ciphers.*

22. RULE FOR NUMERATION. — *Separate the number into periods, beginning at the right.*

Begin at the left and read the number in each period, giving the name of each period except the last.

ADDITION.

23. Addition is the process of uniting two or more numbers.

24. The Sum, or Amount, is the number obtained by addition.

25. PRINCIPLE. — *Only like numbers can be added.*

26. RULE. — *Write the numbers to be added so that units of the same order shall be in the same column.*

Beginning at the right, add each column separately and write the sum, if it is less than ten, under the column added.

If the sum of any column exceeds nine, write the units under the column added, and add the ten or tens with the next column. Write the entire sum of the last column.

SUBTRACTION.

27. **Subtraction** is the process of taking one number from another.

28. **The Minuend** is the number from which another number is taken.

29. **The Subtrahend** is the number subtracted.

30. **The Difference, or Remainder,** is the number obtained by subtraction.

31. PRINCIPLES. — 1. *A number can be subtracted only from a like number.*

2. *The minuend is equal to the sum of the subtrahend and remainder.*

32. RULE. — *Write the subtrahend under the minuend so that units of the same order shall be in the same column.*

Beginning at the right, subtract each figure of the subtrahend from the corresponding figure of the minuend, and write the remainder below.

If any figure in the subtrahend has a greater value than the corresponding figure in the minuend, add ten to the upper figure and subtract; then diminish by one the next order of the minuend, and proceed as before.

MULTIPLICATION.

33. **Multiplication** is the process of uniting two or more equal numbers.

34. **The Multiplicand** is one of the equal numbers united.

35. **The Multiplier** is the number that shows how many equal numbers are united.

36. .**The Product** is the number obtained by multiplication.

37. The multiplier and multiplicand are *factors* of the product.

38. PRINCIPLES. — 1. *The multiplier is an abstract number.*

2. *The multiplicand and product are like numbers.*
3. *The product of several factors is the same in whatever order they are taken.*
4. *The product divided by either factor gives the other factor.*

39. RULE. — *Write the multiplier under the multiplicand so that units of the same order shall be in the same column.*

Multiply each figure of the multiplicand by each significant figure of the multiplier, beginning with units, and write the first figure of each partial product under the figure of the multiplier used.

Add the partial products thus obtained.

40. To multiply by 10, 100, 1000, etc.

RULE. — *Annex as many ciphers to the multiplicand as there are ciphers in the multiplier.*

DIVISION.

41. Division is the process of separating a number into equal parts, or it is the process of finding how many times one number is contained in another.

42. The Dividend is the number divided.

43. The Divisor is the number by which another number is divided.

44. The Quotient is the number obtained by division.

45. Principles. — 1. *When it is required to separate a number into equal parts, the divisor is an abstract number, and the dividend and quotient are like numbers.*

2. *When it is required to find how many times one number is contained in another, the divisor and dividend are like numbers, and the quotient is an abstract number.*

3. *Multiplying the dividend by any number multiplies the quotient by that number.*

4. *Dividing the dividend by any number divides the quotient by that number.*

5. *Multiplying the divisor by any number divides the quotient by that number.*

6. *Dividing the divisor by any number multiplies the quotient by that number.*

7. *Multiplying or dividing both dividend and divisor by the same number does not change the quotient.*

46. Rule. — *Write the divisor at the left of the dividend with a line between them.*

Find how many times the divisor is contained in the fewest figures on the left of the dividend that will contain it, and write the quotient at the right.

Multiply the divisor by this quotient, and write the product under the figures divided. Subtract the product from the partial dividend used, and to the remainder annex the next figure of the dividend for a new dividend.

Divide as before until all the figures of the dividend have been used.

If any new dividend does not contain the divisor, write a cipher in the quotient and bring down the next figure of the dividend.

If there is a remainder after the last division, write it over the divisor at the right of the quotient.

FACTORING.

47. **An Exact Divisor** of a number is a number that will divide it without a remainder.

48. **A Prime Number** is a number that has no exact divisors besides itself and *one.*

49. **A Composite Number** is a number that has exact divisors besides itself and *one.*

50. **An Even Number** is a number that is exactly divisible by *two.*

51. **An Odd Number** is a number that is not exactly divisible by *two.*

52. **The Factors** of a number are the numbers which multiplied together produce the number.

53 **Prime Factors** are factors that are prime numbers.

54. **Common Prime Factors** of two or more numbers are prime numbers that are factors of each of the numbers.

55. **Factoring** is the process of finding the factors of a number.

56. To resolve a composite number into its prime factors.

RULE. — *Divide the number by any prime factor; then divide the quotient by another prime factor, and so on until the quotient is a prime number. The several divisors and the last quotient are the prime factors.*

57. To find the common prime factors of two or more numbers.

RULE. — *Divide the numbers by any common prime factor, and the quotients by any common prime factor, and so on until the quotients have no common factor. The several divisors are the common prime factors.*

CANCELLATION.

58. Cancellation is the process of shortening division by rejecting equal factors from dividend and divisor.

59. Principle. — *Dividing both dividend and divisor by the same number does not change the quotient.*

GREATEST COMMON DIVISOR.

60. A Common Divisor of two or more numbers is a number that is an exact divisor of each of them.

61. The Greatest Common Divisor of two or more numbers is the greatest number that is an exact divisor of each of them.

62. Numbers are *prime to each other* when they have no common factor.

63. Principles. — 1. *Every factor of a number is a divisor of that number.*

2. *A common factor of two or more numbers is a common divisor of those numbers.*

3. *The greatest common divisor of two or more numbers is the product of their common prime factors.*

4. *A common divisor of two numbers is a divisor of their sum and also of their difference.*

5. *A divisor of a number is a divisor of any multiple of that number, and a common divisor of two numbers is a divisor of any multiple of either of them.*

64. To find the greatest common divisor of numbers that are easily factored.

Rule. — *Resolve the numbers into their prime factors and find the product of all the common factors.*

65. To find the greatest common divisor of numbers that are not easily factored.

RULE. — *Divide the greater number by the less; then divide the last divisor by the last remainder, continuing until there is no remainder. The last divisor is the greatest common divisor.*

If more than two numbers are given, find the greatest common divisor of two of them; then find the greatest common divisor of this divisor and another of the given numbers, continuing this process until all the numbers have been used. The last divisor is the greatest common divisor.

LEAST COMMON MULTIPLE.

66. **A Multiple** of a number is a number that is exactly divisible by that number.

67. **A Common Multiple** of two or more numbers is a number that is exactly divisible by each of them.

68. **The Least Common Multiple** of two or more numbers is the smallest number that is exactly divisible by each of them.

69. PRINCIPLES. — 1. *Every multiple of a number contains all the prime factors of that number.*

2. *The least common multiple of two or more numbers contains all the prime factors of each of the numbers, but no others.*

3. *If two or more numbers are prime to each other, their least common multiple is their product.*

70. To find the least common multiple of two or more numbers.

RULE. — *Divide by any prime number that is an exact divisor of two or more of the numbers, and write the quotients and undivided numbers below.*

Divide these numbers as before, and so continue until the quotients and undivided numbers are prime to each other. The product of the divisors and numbers in the last line is the least common multiple.

FRACTIONS.

71. A Fraction is one or more of the equal parts of a unit.

72. The Unit of a Fraction is the number or thing that is divided into equal parts.

73. A Fractional Unit is one of the equal parts into which the number or thing is divided.

74. To express a fraction, two numbers are necessary; one to express the number of equal parts into which the number or thing is divided, and the other to express how many of the parts are taken. They are written, one above and the other below, the same horizontal line.

75. The Numerator is the number above the line, and it shows how many of the equal parts are taken.

76. The Denominator is the number below the line, and it shows into how many equal parts the number or thing is divided.

77. The Terms of a Fraction are the numerator and denominator.

78. A Proper Fraction is a fraction whose numerator is less than the denominator.

79. An Improper Fraction is a fraction whose numerator equals or exceeds the denominator.

80. A Mixed Number is a whole number and a fraction written together.

81. The Reciprocal of a Number is one divided by that number.

82. The Reciprocal of a Fraction is the fraction inverted.

83. PRINCIPLES. — 1. *Multiplying the numerator by any number multiplies the fraction by that number.*

2. *Dividing the numerator by any number divides the fraction by that number.*

3. *Multiplying the denominator by any number divides the fraction by that number.*

4. *Dividing the denominator by any number multiplies the fraction by that number.*

5. *Multiplying or dividing both terms of a fraction by the same number does not change the value of the fraction.*

84. Reduction of Fractions is the process of changing their form without changing their value.

85. A fraction is reduced to its lowest terms when the numerator and denominator are prime to each other.

86. To reduce a fraction to higher terms.

RULE. — *Multiply both terms of the fraction by the same number.*

87. To reduce a fraction to its lowest terms.

RULE. — *Divide both terms of the fraction by their greatest common divisor.*

88. To reduce an improper fraction to a whole or mixed number.

RULE. — *Divide the numerator by the denominator.*

89. To reduce a mixed number to an improper fraction.

RULE. — *Multiply the whole number by the denominator, add the numerator of the fraction to the product, and write the sum over the denominator.*

90. To reduce fractions to a common denominator.

RULE. — *Find the least common multiple of the denominators for a common denominator, divide the least common multiple of the denominators by the denominator of each fraction, and multiply the numerator by the quotient.*

ADDITION OF FRACTIONS.

91. **Like Fractions** are fractions that express like fractional units.

92. To express like fractional units, fractions must have a common denominator.

93. PRINCIPLE. — *Only like fractions can be added.*

94. RULE. — *If necessary, reduce the fractions to a common denominator, add the numerators, and write the sum over the common denominator.*

If there are mixed numbers, add the whole numbers and fractions separately and unite the results.

Reduce all results to their lowest terms, and improper fractions to whole or mixed numbers.

SUBTRACTION OF FRACTIONS.

95. PRINCIPLE. — *A fraction can be subtracted only from a like fraction.*

96. RULE. — *If necessary, reduce the fractions to a common denominator, find the difference between the numerators, and write the result over the common denominator.*

If either or both are mixed numbers, subtract the fraction and whole number separately and unite the results.

MULTIPLICATION OF FRACTIONS.

97. In multiplication of fractions, one or both of the factors are fractions.

98. RULE. — *Express all factors in the fractional form. Cancel all factors common to numerators and denominators, and multiply the remaining factors in the numerators together for the numerator of the product, and the remaining factors in the denominators together for the denominator of the product.*

DIVISION OF FRACTIONS.

99. In division of fractions, either the divisor or dividend is a fraction. Both may be.

100. RULE. — *Express both dividend and divisor in the fractional form, invert the divisor, and proceed as in multiplication of fractions.*

101. **A Complex Fraction** is a fraction having a fraction in its numerator, or in its denominator, or in both.

102. **To reduce a complex fraction to a simple one.**

RULE. — *Perform the indicated operations.*

103. **To find the part that one number is of another.**

RULE. — *Make the smaller number the numerator and the larger number the denominator of a fraction, and reduce the fraction to its lowest terms.*

104. **To find the whole of a number when a fractional part of it is given.**

RULE. — *Divide the part by the numerator and multiply the quotient by the denominator.*

DECIMALS.

105. **A Decimal Fraction,** or **Decimal,** is a fraction whose denominator is 10 or some power of 10.

106. Decimals may be expressed in words, in the form of common fractions, or in the decimal form.

107. For convenience, the denominator of a decimal is not written, it being indicated by placing a period, or a period and one or more ciphers, before the numerator.

108. **The Decimal Point** is the period placed before a decimal.

109. **Decimal Places** are the places at the right of the decimal point.

110. A Mixed Decimal is a whole number and a decimal written together.

111. A Complex Decimal is a decimal which has a common fraction at the right of the decimal.

To the Teacher. — Express several decimals in the form of common fractions, and then express them in the decimal form, showing the pupils that the number of decimal places is always equal to the number of ciphers in the denominator. In order that they may be able to write decimals readily from dictation, they should know, without any hesitation, the number of ciphers in the denominators of decimals up to 1,000,000.

112. To write decimals.

Rule. — *Write the numerator, and from the right of the numerator point off as many decimal places as there are ciphers in the denominator, prefixing ciphers, if necessary, to make the required number of decimal places.*

113. To read decimals.

Rule. — *Read the numerator and give the name of the right-hand figure.*

114. Principles. — 1. *Rejecting ciphers from the right of a decimal does not change its value, since it is equivalent to dividing both terms of the fraction by the same number.*

2. *Annexing ciphers to a decimal does not change its value, since it is equivalent to multiplying both terms of the fraction by the same number.*

3. *Inserting ciphers between the decimal point and the numerator divides the fraction, since it is equivalent to multiplying the denominator.*

4. *Rejecting ciphers from the left of a decimal multiplies the fraction, since it is equivalent to dividing the denominator.*

115. To reduce decimals to a common denominator or to similar decimals.

RULE. — *Give to all the same number of decimal places by annexing ciphers.*

116. To reduce a decimal to a common fraction.

RULE. — *Write the decimal in the form of a common fraction and reduce it to its lowest terms.*

117. To reduce a common fraction to a decimal.

RULE. — *Annex ciphers to the numerator and divide by the denominator, and from the right of the quotient point off as many decimal places as there are ciphers annexed.*

ADDITION AND SUBTRACTION OF DECIMALS.

118. Decimals are added and subtracted the same as whole numbers.

MULTIPLICATION OF DECIMALS.

119. RULE. — *Multiply as in whole numbers, and from the right of the product point off as many decimal places as there are decimal places in both factors.*

DIVISION OF DECIMALS.

120. RULE. — *Divide as in whole numbers, and from the right of the quotient point off as many decimal places as the number of decimal places in the dividend exceeds the number of decimal places in the divisor.*

NOTE 1. Before beginning the division, always have as many decimal places in the dividend as there are in the divisor.

NOTE 2. When there is a remainder after using all the figures of the dividend, annex ciphers and continue the division.

NOTE 3. For ordinary purposes, it is sufficiently accurate to carry the division to four decimal places.

NOTE 4. When there is a remainder after the last division, indicate it by placing the sign + after the quotient.

121. To find the cost of articles bought by the 100.

RULE. — *Point off two decimal places from the right of the number, and multiply the price by it.*

122. To find the cost of articles bought by the 1000.

RULE. — *Point off three decimal places from the right of the number, and multiply the price by it.*

123. To find the cost of articles bought by the ton.

RULE. — *Point off three decimal places from the right of the number of pounds, and multiply half the price of a ton by it.*

ACCOUNTS AND BILLS.

124. **A Debtor** is a person who owes another.

125. **A Creditor** is a person to whom a debt is due.

126. **An Account** is a record of debts and credits between two persons doing business with each other.

127. **A Bill** is a written statement of an account, and it is made by the creditor.

128. **A Receipt** is a written acknowledgment of the payment of part or all of a debt.

129. A bill is receipted when the words, "Received payment," are written at the bottom, and the creditor's name is signed, either by himself, or by some authorized person.

TO THE TEACHER. — Show pupils the forms of receipts for the full and partial payment of an account, also the forms of bills. Teach them how to receipt a bill, both as the proprietor and for the *proprietor*.

DENOMINATE NUMBERS.

130. A Simple Number is a number composed of units of the same kind.

131. A Denominate Unit is a unit of weight or measure.

132. A Denominate Number is a number composed of denominate units.

133. A Simple Denominate Number is a number composed of denominate units of one kind.

134. A Compound Denominate Number is a number composed of denominate units of two or more kinds.

135. Reduction of Denominate Numbers is the process of changing them from one denomination to another without changing their value.

136. Reduction Descending is the process of changing a denominate number to an equivalent number of a lower denomination.

137. Reduction Ascending is the process of changing a denominate number to an equivalent number of a higher denomination.

138. Linear Measure is used in measuring lines and distances.

12 inches (in.) . . . = 1 foot . . . . ft.
3 feet . . . . = 1 yard . . . . yd.
5½ yards, or 16½ feet . = 1 rod . . . . rd.
40 rods . . . . . . = 1 furlong . . . fur.
320 rods, or 5280 feet = 1 mile . . . . mi.

139. Surveyors' Linear Measure.

7.92 inches . . . . = 1 link . . . . l.
25 links . . . . . . = 1 rod . . . . rd.
4 rods . . . . = 1 chain . . . . ch.
80 chains . . . . . . = 1 mile . . . . mi.

140. Square Measure is used in measuring surfaces.

144 sq. in. . . . . . = 1 square foot . . sq. ft.
9 square feet . . . = 1 square yard. . sq. yd.
30¼ sq. yd.
272¼ sq. ft. . . . = 1 square rod. . . sq. rd.
160 square rods . . = 1 acre . . . . A.
640 acres . . . . . . = 1 square mile . . sq. mi.

141. A Section of land is a square mile, and contains 640 acres.

142. Roofing, flooring, and slating are often estimated by the square, which contains 100 square feet.

143. Surveyors' Square Measure.

625 square links (sq. l.) = 1 square rod . . sq. rd.
16 square rods . . = 1 square chain . sq. ch.
10 square chains . . = 1 acre . . . . A.

144. Cubic Measure is used in measuring volumes.

1728 cu. in. . . . . . = 1 cubic foot . . cu. ft.
27 cubic feet . . . = 1 cubic yard . . cu. yd.
16 cubic feet . . . = 1 cord foot . . cd. ft.
128 cubic feet . . . = 1 cord . . . . cd.

145. Liquid Measure is used in measuring liquids.

4 gills (gi.) . . . . . = 1 pint . . . . pt.
2 pints . . . . . . = 1 quart . . . . qt.
4 quarts . . . . . . = 1 gallon . . . gal.

146. The standard gallon contains 231 cubic inches.

147. Although barrels vary in size, the capacity of cisterns is often estimated in barrels of 31½ gallons.

148. Dry Measure is used in measuring fruit, grain, vegetables, etc.

2 pints . . . . . . = 1 quart . . . . qt.
8 quarts . . . . . . = 1 peck . . . . pk.
4 pecks . . . . . . = 1 bushel . . . bu.

149. The standard bushel contains 2150.42 cubic inches.

150. **Avoirdupois Weight** is used in weighing all common articles.

16 ounces (oz.) . . . = 1 pound . . . lb.
100 pounds . . . . = 1 hundredweight cwt.
2000 pounds . . . = 1 ton . . . . T.

151. The *long ton* of 2240 pounds is used in weighing goods at the custom houses and weighing coal at the mines.

152. **Troy Weight** is used in weighing gold, silver, and jewels.

24 grains (gr.) . . . = 1 pennyweight . pwt.
20 pennyweights . . = 1 ounce . . . . oz.
12 ounces . . . . . . = 1 pound . . . lb.

153. **Apothecaries' Weight** is used by druggists in weighing medicines not liquid.

20 grains . . . . . . = 1 scruple . . . sc. or ℈
3 scruples . . . . . = 1 dram . . . . dr. or ʒ
8 drams . . . . . . = 1 ounce . . . . oz. or ℥
12 ounces . . . . . = 1 pound . . . lb.

154. One pound Avoirdupois = 7000 grains.

155. One pound Troy = 5760 grains.

156. One pound Apothecaries' = 5760 grains.

157. **English or Sterling Money** is the currency of Great Britain.

4 farthings (far.) . . = 1 penny . . . d.
12 pence . . . . . . = 1 shilling . . . s.
20 shillings . . . . = 1 pound . . . £.

158. The value of £1 is $4.8665 in United States gold coin.

DENOMINATE FRACTIONS.

159. **A Denominate Fraction** is a fraction of a denominate unit. It may be a common fraction or a decimal.

160. To reduce a denominate fraction to integers of lower denominations.

RULE. — *Multiply the fraction by the number that will reduce it to the next lower denomination, and reduce the result to a whole or mixed number.*

Proceed with the fractional part, if any, in the same manner until it is reduced to the denominations required.

161. To reduce a denominate fraction to a denominate fraction of a lower denomination.

RULE. — *Multiply the fraction successively by the numbers that will reduce it to the required denomination.*

162. To reduce a denominate number to a fraction of a higher denomination.

RULE. — *Reduce the given number to its lowest denomination for the numerator, and a unit of the required denomination to the same denomination for the denominator of the required fraction.*

If it is required to reduce the denominate number to a decimal of a higher denomination, first reduce it to a common fraction and then reduce the common fraction to a decimal.

163. To reduce a denominate fraction to a fraction of a higher denomination.

RULE. — *Divide the fraction successively by the numbers that will reduce it to the required denomination.*

164. To find the area of rectangular surfaces.

RULE. — *Multiply the length by the breadth.*

To the Teacher. — In the process of finding the area of rectangular surfaces, lead pupils to see that the dimensions must be expressed in the same denomination before multiplying. Also lead them to see that the multiplicand expresses the number of square units in that part of the surface which is the whole length and one unit in width, and that the whole surface contains as many times that number of square units as there are units in width.

CARPETING ROOMS.

165. The number of yards of carpet that must be bought for a room is found by multiplying the number of yards in each strip by the number of strips.

If the strips are to run lengthwise, to find the number of strips needed, divide the width of the room in inches by the width of the carpet in inches. If the quotient is 6 and a fraction, 7 strips must be bought; if 7 and a fraction, 8 strips must be bought, etc. The length of each strip is the length of the room plus the waste on each strip for matching.

If the strips are to run across the room, divide the length of the room in inches by the width of the carpet in inches. The length of each strip is the width of the room plus the waste on each strip for matching.

166. To find one dimension of a rectangle when the area and other dimension are given.

Rule. — *Divide the area by the given dimension.*

Note. If the area is given in square feet, the given dimension must be expressed in feet.

167. To find the volume of rectangular solids.

Rule. — *Multiply the length by the breadth and that product by the thickness.*

To the Teacher. — In the process of finding the volume of rectangular solids, lead pupils to see that all the dimensions must be expressed in the same denomination. Also lead them to see that the first multiplicand expresses the number of cubic units in that part of the solid which is the whole length, one unit in width, and one unit in thickness; and that the first product, or second multiplicand, expresses the number of cubic units in that part of the solid which is the whole length, the whole width, and one unit in thickness. The last product expresses the whole number of cubic units in the solid.

168. To find one dimension of a rectangular solid when the volume and two dimensions are given.

RULE. — *Divide the volume by the product of the two given dimensions.*

NOTE. If the volume is given in cubic inches, the two given dimensions must be expressed in inches.

169. To find the time between two given dates.

FIRST METHOD. — Subtract as in denominate numbers, reckoning 12 months a year and 30 days a month.

SECOND METHOD. — First find the number of whole years, then the remaining whole months, and then the remaining number of days.

THIRD METHOD. — First find the number of whole years, and then the remaining number of days. By this method, if the time is less than a year, it is expressed wholly in days.

BOARD MEASURE.

170. Lumber is usually bought and sold by the thousand; that is, a thousand board feet.

171. **A Board Foot** is 1 foot long, 1 foot wide, and 1 inch or less in thickness.

172. To find the number of board feet in any piece of sawed lumber.

RULE. — *Multiply the length in feet by the width in feet and that product by the thickness in inches, if the thickness is more than 1 inch.*

PERCENTAGE.

173. The numbers employed in percentage are the Rate, Percentage, Base, Amount, and Difference.

174. The Rate is the number of hundredths of a number taken.

175. The Percentage is that part of a number indicated by the rate.

176. The Base is the number on which the percentage is computed.

177. The Amount is the sum of the base and percentage.

178. The Difference is the base less the percentage.

179. To find the percentage when the base and rate are given.

RULE. — *Multiply the base by the rate expressed decimally.*

180. To find the rate when the percentage and base are given.

RULE. — *Divide the percentage by the base, carrying the division to hundredths. Express the decimal thus obtained with the symbol.*

181. To find the base when the percentage and rate are given.

RULE. — *Divide the percentage by the rate expressed decimally.*

182. To find the base when the amount and rate are given.

RULE. — *Divide the amount by 1 plus the rate.*

183. To find the base when the difference and rate are given.

RULE. — *Divide the difference by 1 less the rate.*

PROFIT AND LOSS.

184. In Profit and Loss,

The rate per cent gain or loss is the *rate.*

The number of dollars gain or loss is the *percentage.*

The cost is the *base.*

When there is a gain, the selling-price is the *amount.*

When there is a loss, the selling-price is the *difference.*

COMMISSION.

185. A Commission Merchant, or Agent, is a person who buys and sells goods, makes collections, or transacts business for another.

186. The Commission is the compensation of a commission merchant.

187. A Consignment is a quantity of merchandise sent to a commission merchant to be sold.

188. The Consignor is the person who sends the merchandise to be sold.

189. The Consignee is the person to whom the merchandise is sent.

190. The Net Proceeds of a sale is the sum left after the commission and other charges have been deducted.

191. In commission,

The rate per cent commission is the *rate.*

The agent's commission is the *percentage.*

The sum received by the agent from a sale or collection, or the sum invested by the agent, is the *base.*

The sum that includes the investment and the agent's commission is the *amount.*

The sum left from a sale or collection after the agent's commission *alone* is deducted is the *difference.*

NOTE. When other charges besides the agent's commission have been deducted from the amount of the sale, all charges except the agent's commission must be added to the net proceeds to get the *difference.*

INSURANCE.

192. Fire Insurance is indemnity against loss or damage of property by fire.

193. Marine Insurance is indemnity against loss of a ship or cargo at sea.

194. The Insurer, or Underwriter, is the party that insures or takes the risk. The business of insurance is done by Insurance Companies.

195. The Insured is the person protected.

196. The Policy is the contract given to the insured by the insurance company.

197. The Premium is the sum paid for insurance.

198. The Sum Covered by Insurance is the sum insured less the premium, and it is the sum saved by the insured in case the property is destroyed.

NOTE 1. It is the practice of insurance companies to insure property for less than its full value. This is done to guard against fraud and excessive loss.

NOTE 2. If property is insured for its full value and is destroyed, the owner loses only the premium.

NOTE 3. If property is insured for less than its full value and is destroyed. the owner loses the part not insured and the premium.

NOTE 4. When insured property is only damaged or partially destroyed, insurance companies are required to make good only the *estimated* or *known* loss. Insurance companies never obligate themselves to pay in excess of the *actual* loss.

199. In insurance,

The rate per cent premium is the *rate.*
The premium is the *percentage.*
The sum insured is the *base.*
The sum covered by insurance is the *difference.*

TAXES.

200. A Tax is a sum of money raised for public purposes.

201. A Property Tax is a tax on property.

202. A Personal Tax is a tax on the person.

203. Property is of two kinds, personal, and real estate.

204. Personal Property is movable property.

205. Real Estate is immovable property.

206. An Assessment-roll is a list of the names of taxable inhabitants, and the value of each person's property.

207. Assessors are officers appointed to estimate the value of taxable property and prepare the assessment-roll.

208. A Tax-roll is a list of the names of the taxable inhabitants with the tax of each.

209. In taxes,

The tax on $1 is the *rate.*
The whole tax is the *percentage.*
The value of the property is the *base.*

210. To prepare a tax-roll, first divide the sum of money to be raised by the total valuation, carrying the division to six decimal places. Multiply the total valuation by the rate thus obtained to ascertain if this rate will give the required sum. If the product is much less than the tax, increase by 1 the last figure in the rate. Then make a table showing the tax on:

$1
$2
$3
$4
$5
$ 6
$ 7
$ 8
$ 9
$10
$20
$30
$40
$50
$60
$ 70
$ 80
$ 90
$100
$200
$300
$400
$500
$600
$700
$ 800
$ 900
$1000
$2000
$3000
$4000
$5000
$6000
$7000
$8000

211. Include in the table also *any other sums that occur frequently in the assessment-roll.* Each person's tax is then easily computed from the table.

NOTE. The rate determined upon is the tax on $1. If this is multiplied by 2, 3, 4, 5, 6, 7, 8, and 9, the several products will be the tax on the respective number of dollars. Move the decimal point one place to the right in each of these products, and the results will be the tax on $10, $20, $30, $40, $50, $60, $70, $80, and $90. Move the decimal point two places to the right in each of the first products, and the results will be the tax on $100, $200, $300, etc. Move the decimal point three places to the right in each of the first products, and the results will be the tax on $1000, $2000, $3000, etc.

DUTIES.

212. Duties are taxes levied by governments on imported goods.

213. A Specific Duty is a fixed sum levied on goods without regard to their value.

214. An Ad Valorem Duty is a tax of a certain per cent levied on the cost of goods in the country from which they are imported.

215. In computing ad valorem duty,

The rate of duty is the *rate.*
The duty is the *percentage.*
The cost of the goods is the *base.*

INTEREST.

216. **Interest** is money paid for the use of money.

217. **The Principal** is the sum for the use of which interest is paid.

218. **The Amount** is the sum of the principal and interest.

219. **The Rate per Annum** is the interest of one dollar for one year.

220. **The Rate of Interest** is the interest of one dollar for the specified time.

221. **Legal Interest** is the interest computed at the rate fixed by law.

222. **Usury** is interest computed at a rate higher than the legal rate.

223. **A Promissory Note** is a written promise to pay a specified sum of money on demand or at a given time.

224. **The Face** of a note is the sum named in the note.

225. **The Maker** of a note is the person who signs it.

226. **The Payee** is the person to whom the money is to be paid.

227. **The Holder** is the person who has the note in his possession.

228. **The Indorser** is the person who writes his name on the back of the note as security for its payment.

229. **A Joint Note** is a note signed by two or more persons.

230. **A Demand Note** is a note payable on demand.

231. **A Time Note** is a note payable at a specified future time.

232. **A Bank Note** is a note payable at a bank.

233. **Days of Grace** are three days usually allowed for the *payment of* a note after the time named in the note expires.

234. The Maturity of a Note is the last day of grace.

NOTE 1. No days of grace are allowed on demand notes.

NOTE 2. If the last day of grace falls on Sunday or a legal holiday, the note matures the day before or the day after, according to the law of the State in which it is drawn.

NOTE 3. If the time named in the note is expressed in months, the note is nominally due on the corresponding day of the month, or on the last day when there is no corresponding day, and matures three days later.

235. A Negotiable Note is a note that may be sold or transferred. To be negotiable, a note must be made payable to the *bearer* or to the *order* of the payee.

NOTE 1. A note payable to the order of the payee must be indorsed before it can be transferred. The payee may simply write his name on the back of the note. This is called an *indorsement in blank*, and the note is then payable to the holder. The payee may write on the back of the note, "Pay to the order of Geo. E. Ames," and sign his name. This is called an *indorsement in full*, and the note is payable only to Geo. E. Ames or some one to whom he may order it paid.

NOTE 2. A note payable to the *bearer* is negotiable without indorsement.

236. JOINT NOTE.

$487.45. *Albany, N.Y., May 9, 1892.*

Six months after date, we promise to pay to the

order of ~~~~~~~~ *John W. Hart* ~~~~~~~~

Four hundred eighty-seven and $\frac{45}{100}$ *Dollars,*

with interest. *Value received.*

James A. Northup.
Charles C. Thompson.

237. DEMAND NOTE.

$743. *Troy, N.Y., May 9, 1892.*

On demand, I promise to pay
C. W. Hunt or order,
Seven hundred forty-three Dollars,
with interest. Value received.

A. W. Turner.

238. BANK NOTE.

$325. *Tarrytown, N.Y., Aug. 4, 1892.*

Sixty days after date, I promise to pay to the
order of Rufus King
Three hundred twenty-five Dollars,
at the **Tarrytown National Bank.** *Value received.*

Due Oct. $^{3}/_{6}$. *F. M. Hough.*

NOTE 1. A promissory note should contain the words, *value received.*

NOTE 2. If a note contains the words, *with interest,* it draws interest from date.

NOTE 3. If a note does not contain the words, *with interest,* it only draws interest for the time it remains unpaid after maturity.

239. To compute interest at 6%.

RULE. — *Take as many times 6 cents as there are years, ½ as many cents as there are months, and ⅙ as many mills as there are days, and multiply the principal by their sum.*

At 7%, add to the interest at 6% ⅙ of itself.

At 7½%, add to the interest at 6% ¼ of itself.

At 8%, add to the interest at 6% ⅓ of itself.
At 9%, add to the interest at 6% ½ of itself.
At 5%, subtract from the interest at 6% ⅙ of itself.
At 4½%, subtract from the interest at 6% ¼ of itself.
At 4%, subtract from the interest at 6% ⅓ of itself.

240. To find the interest at any other rate, divide the interest at 6% by 6 and multiply the quotient by the given rate, using it as a whole number.

241. When the time is exact years, or years and an aliquot part of a year, multiply the principal by the rate per annum and that product by the number of years.

EXACT INTEREST.

242. To compute exact interest for any part of a year.

RULE. — *If the time is less than a year, find the time in days, multiply the interest for one year by the number of days, and divide the product by 365 if it is a common year, and 366 if it is a leap year.*

If the time is more than a year, find the time in years and days by the third method. Compute the interest for the whole years by the usual method and add the interest for the whole years to the exact interest for the days.

ANNUAL INTEREST.

243. Annual Interest is simple interest on the principal and on any interest after it is due.

244. In order that annual interest may be collected on a note, the note must contain the words *with interest payable annually*, or *with annual interest.*

245. To find the amount due on a note with annual interest when the interest has not been paid at the end of each year.

RULE. — *Compute the interest on the principal for the entire time and the interest on each year's interest for the time it was unpaid. The sum of the principal and all the interest is the amount due on the note.*

COMPOUND INTEREST.

246. Compound Interest is interest on the principal and also on the interest, which at stated intervals is added to the principal. The interest may be compounded, or added to the principal, annually, semi-annually, or at any other interval, according to agreement.

247. To find the amount of any sum at compound interest.

RULE. — *Find the amount of the principal for the first period. Treating this amount as a new principal, find the amount of it for the next period, and so on for the entire time.*

If the compound interest is required, subtract the principal from the last amount.

PROBLEMS IN INTEREST.

248. To find the principal when the interest, time, and rate per annum are given.

RULE. — *Divide the interest by the rate of interest.*

249. To find the principal when the amount, time, and rate per annum are given.

RULE. — *Divide the amount by $1 plus the rate of interest.*

250. To find the rate per annum when the principal, interest, and time are given.

RULE. — *Divide the interest by the interest at one per cent.*

251. To find the time when the principal, interest, and rate per annum are given.

RULE. — *Divide the given interest by the interest for one year. Reduce the fraction of a year, if any, to months and days.*

PARTIAL PAYMENTS.

252. Partial Payments are payments in part of a note, bond, or other obligation.

253. An Indorsement is an acknowledgment of a payment on a note or bond, written on the back of the note or bond, stating the time and amount of the payment.

254. The rule given below for finding the amount due on a note on which partial payments have been made is called the United States Rule, and is based on the following principles:

1. Payments must be applied first to the discharge of interest then due, and the remainder, if any, toward the payment of the principal.
2. Unpaid interest must not be added to the principal.
3. Interest must accrue only on the principal.

255. RULE. — *Find the amount of the note to the time when the payment, or the sum of the payments, equals or exceeds the interest then due.*

Subtract the payment, or the sum of the payments, from the amount, and treat the remainder as a new principal.

Proceed in the same manner with the new principal, and each succeeding one, to the time of settlement.

TRADE DISCOUNT.

256. Trade Discount is a percentage deducted from the face of bills, the list price of goods, or from the amount of a debt without regard to time.

257. The Net Price of goods is the sum received for them.

258. In trade discount,

The rate per cent discount is the *rate.*
The discount is the *percentage.*
The face of the bill is the *base.*
The net price is the *difference.*

259. Bills of goods are often sold subject to two or more discounts. When this is the case, the first discount is computed on the face of the bill, the second on the sum left after the first discount is deducted, and so on.

TRUE DISCOUNT.

260. True Discount is a deduction made for the payment of a sum of money before it is due.

261. The Present Worth of a debt due at some future time is the sum which, put at interest at the current rate, will amount to the debt at the time it is due.

262. The Amount of the Debt is the sum to be paid when the debt is due.

NOTE 1. If the debt does not bear interest, *the amount of the debt* is the sum named.

NOTE 2. If the debt bears interest, *the amount of the debt* is the sum named, plus the interest of the sum named for the given time.

263. The Term of Discount is the time from the day of discount to the time when the debt is due.

264. In true discount,

The discount is the *percentage.*
The present worth is the *base.*
The amount of the debt is the *amount.*

265. To find the present worth.

RULE. — *Divide the amount of the debt by the amount of one dollar for the term of discount.*

BANK DISCOUNT.

266. If a man wishes to borrow money at a bank, he presents a note either made or indorsed by himself; and if the officers of the bank are satisfied that the maker and indorser are responsible persons, they will pay to the person presenting the note the sum due on the note at maturity, less the interest of that sum from that day to the day of maturity, and retain the note in the bank. The note is then said to be discounted.

267. Notes for discount at a bank are always without interest. A man may hold a note which was given to him by a person owing him. This note may or may not bear interest. At the time he receives the note, or at any time before it is due, he may wish to obtain the money on it at a bank. He indorses the note and presents it at a bank. If the maker and indorser are responsible persons, the bank will discount the note the same as though it had been drawn for discount.

268. Notes for discount at a bank are never made payable to the bank. This practice is observed because it affords a bank greater security; for, by law, both the maker and indorser are equally responsible for the payment of the note.

269. The Amount Due is the sum to be paid on the note at maturity.

NOTE 1. If the note does not bear interest, *the amount due* is the face of the note.

NOTE 2. If the note bears interest, the *amount due* is the *amount* of the note at maturity.

270. The Term of Bank Discount is the number of days from the day of discount to the day of maturity.

271. Bank Discount is the interest of the amount due for the term of bank discount.

272. The Proceeds of a note is the sum received for it when discounted, and is the amount due less the bank discount.

273. In bank discount,

The bank discount is the *percentage.*
The amount due is the *base.*
The proceeds is the *difference.*

274. To find the bank discount and proceeds.

RULE. — *Compute the interest of the amount due for the term of bank discount.*

Subtract the bank discount from the amount due.

275. To find the face of a note.

RULE. — *Divide the proceeds by the proceeds of $1 for the term of bank discount.*

EXCHANGE.

276. Exchange is the method of making payments in distant places by means of drafts.

277. A Draft is a written order by one person to another to pay a specified sum of money to a third person named, or to his order.

278. The Face of a draft is the sum named in the draft.

279. The Drawer, or **Maker,** is the person who signs the draft.

280. The Drawee is the person who is requested to pay the money.

281. The Payee is the person to whom the money is to be paid.

282. A Sight Draft is a draft payable on presentation to the drawee.

283. A Time Draft is a draft payable at a specified time after presentation, or after date.

284. The Acceptance of a draft is the promise made by the *drawee* to pay the draft at maturity. This he does by writing the word "Accepted" across the face of the draft, with the date and his name. This is necessary only on time drafts. When a time draft has been accepted, it is then called an *acceptance.*

285. The Indorsement of a draft is the writing upon the back by which the payee transfers the payment to another.

286. The cost of $1 of a sight draft is $1 increased by the rate of premium or diminished by the rate of discount.

287. The cost of $1 of a time draft is $1 increased by the rate of premium or diminished by the rate of discount, and this result diminished by the interest of $1 for three days more than the time named in the draft.

288. To find the cost of a draft.

RULE. — *Multiply the face of the draft by the cost of $1 of the draft.*

289. To find the face of a draft.

RULE. — *Divide the cost of the draft by the cost of $1 of the draft.*

290. SIGHT DRAFT.

$600. *Albany, N.Y., Aug. 4, 1892.*

At sight, pay to the order of

S. J. Preston

Six hundred Dollars.

Value received, and charge to the account of

Henry R. Pierson

To Henry Clews & Co.,
New York.

291. TIME DRAFT.

$400. *Rochester, N.Y., May 2, 1892.*

Sixty days after date pay to the order of

Charles E. Gorton

Four hundred Dollars.

Value received, and charge to the account of

Theodore Morford,
Cashier.

To Drexel, Morgan & Co
New York.

292. If A in Chicago owes B in New York, there are two ways in which payment may be made by draft.

First, A may go to a bank and buy a draft and send it to B. In this case, the cashier of the bank in Chicago is the *maker*, and the cashier of a bank in New York is the *drawee.* A may have the draft made payable to B, in which case A sends it to B without indorsement. A may have the draft made payable to himself, in which case he must indorse it before he sends it to B. The latter method is preferable.

Second, B may "*draw on*" A. In this case, B is the *maker* and A is the *drawee.* B makes the draft payable to the bank in New York where he has an account, or to the cashier of that bank, or to some bank in Chicago. The New York bank sends the draft to a Chicago bank, and the cashier of the Chicago bank notifies A. If it is a sight draft, A pays it at once. If it is a time draft, he accepts it and pays it at maturity. If, for any reason, A refuses to pay the draft, it is sent back to the New York bank.

STOCKS.

293. **A Company** is a number of persons associated together for the transaction of business.

294. **A Corporation,** or **Incorporated Company,** is a company organized and regulated by law.

295. **A Charter** is the legal document which specifies the rights and obligations of a corporation.

296. **The Capital,** or **Capital Stock,** of a corporation is the property or money contributed to establish and carry on the business.

297. **A Share** is one of the equal parts into which the capital stock is divided. A share is usually $100, though it is sometimes less.

298. **The Stockholders** are. the owners of the capital stock.

299. A Certificate of Stock is a paper signed by the officers of a corporation and given to each stockholder, specifying the number of shares owned by him and the par value of each share.

300. The Par Value of stocks is their nominal or face value.

301. The Market Value of stocks is the price at which they sell.

302. Stocks are *above par* or *at a premium* when they sell for more than their nominal value.

303. Stocks are *below par* or *at a discount* when they sell for less than their nominal value.

304. Bonds are interest-bearing notes of governments or corporations.

305. Bonds are generally named according to their rate of interest.

306. A Mortgage is a conditional sale, made to secure the payment of a bond.

307. Coupons are certificates of interest attached to bonds. They are cut off and presented for payment as often as the interest is due, and are held as receipts by those paying the interest.

308. The term Stocks, as used in business and in arithmetic, includes the capital stock of corporations and bonds.

309. The Gross Income is the entire receipts.

310. The Net Income is the sum left after all expenses are deducted.

311. A Dividend is a sum of money divided among the stockholders from the net profits of the business.

312. An Assessment is a sum of money required of the stockholders to meet the losses or expenses of the business.

313. A Surplus is a portion of the net earnings left in the business. It is the practice of banks to accumulate a surplus fund.

314. A Stock Broker is a person who buys and sells stocks for others.

315. Brokerage is the fee or compensation of a broker. It is usally $\frac{1}{8}$% of the par value.

316. A Board of Directors is a certain number of the stockholders, elected by the stockholders to manage the business. In the election of directors each stockholder has as many votes as he owns shares of stock.

317. To find the cost of a given amount of stock.

RULE. — *Multiply the par value by the cost of one dollar of stock.*

318. To find the sum received for a given amount of stock.

RULE. — *Multiply the par value by the market value of one dollar less the brokerage.*

319. To find how much stock a given sum will purchase.

RULE. — *Divide the sum to be invested by the cost of one dollar of stock.*

320. To find the dividend or interest.

RULE. — *Multiply the par value by the rate of dividend or interest.*

321. To find the rate of income on the investment when stock is purchased at a given price.

RULE. — *Divide the rate of dividend or interest by the cost of one dollar of stock.*

EQUATION OF PAYMENTS.

322. Equation of Payments is the process of finding the time when several debts, due at different times without interest, may all be paid at one time without loss of interest to either debtor or creditor.

323. The Term of Credit is the time to elapse before a debt is due.

324. The Average Term of Credit is the time to elapse before several debts, due at different times, may all be paid at once without loss of interest to either debtor or creditor.

325. The Equated Time of Payment is the time at which the several debts may be paid at once.

326. To find the equated time of payment when the terms of credit begin at the same time.

RULE. — *Multiply each debt by its term of credit and divide the sum of the products by the sum of the debts. The quotient will be the average term of credit.*

Add the average term of credit to the date at which all the terms of credit begin, and the result will be the equated time of payment.

327. To find the equated time of payment when the terms of credit begin at different dates.

RULE. — *Find the date when each debt matures. Take the first day of the month in which one of the debts matures first as a focal date, and find the number of days from the focal date to the maturity of each debt.*

Multiply each debt by its number of days, and divide the sum of the products by the sum of the debts. The quotient will be the average term of credit from the focal date.

Add the average term of credit to the focal date, and the result will be the equated time of payment.

328. To find the equated time of payment of part of a debt when the other part has been paid before maturity.

RULE. — *Multiply each payment by the time it was paid before it was due, and divide the sum of the products by the unpaid part of the debt. Add this time to the maturity of the debt.*

NOTE 1. If any debt is paid before the equated time of payment, only the present worth of it should be paid.

NOTE 2. If any debt is paid after the equated time of payment, interest must be paid on it from the equated time of payment.

RATIO AND PROPORTION.

329. A **Ratio** is the relation between two like numbers, expressed by the quotient of the first divided by the second.

330. The Terms of a ratio are the two numbers compared.

331. The Antecedent is the first term of a ratio.

332. The Consequent is the second term of a ratio.

333. The antecedent and consequent form a couplet.

334. A Simple Ratio is a ratio whose terms are expressed by single numbers.

335. A Compound Ratio is a ratio whose terms are expressed by their factors.

336. A Complex Ratio is a simple ratio having a fraction in either term.

337. PRINCIPLES. — *1. The two terms of a ratio must be like numbers.*

2. Multiplying the antecedent by any number multiplies the ratio by that number.

3. Dividing the antecedent by any number divides the ratio by that number.

4. Multiplying the consequent by any number divides the ratio by that number.

5. Dividing the consequent by any number multiplies the ratio by that number.

6. Multiplying or dividing both terms of a ratio by the some number does not change the ratio.

338. **A Proportion** is an equality of ratios.

339. **A Simple Proportion** is an equality of two simple ratios.

340. **A Compound Proportion** is an equality of two ratios one or both of which are compound.

341. **A Continued Proportion** is an equality of three or more ratios.

342. **The Extremes** of a proportion are the first and last terms.

343. **The Means** of a proportion are the second and third terms.

344. **A Mean Proportional** between two numbers is the number that may be made the two means of the proportion.

345. PRINCIPLES. — *1. In any proportion the product of the means is equal to the product of the extremes.*

2. Either mean is equal to the product of the extremes divided by the other mean.

3. Either extreme is equal to the product of the means divided by the other extreme.

CAUSE AND EFFECT

346. In every problem in proportion there are two conditions, and in each condition there are two kinds of elements. Some of them may be considered producing elements, and are called *causes.* The others refer to the results produced, and are called *effects.* In the solution of problems in proportion by cause and effect, it is assumed that *like causes* produce *like effects,* hence the ratio between two like causes is equal to the ratio between two like effects. The causes and effects in a problem will therefore form a proportion.

347. Rule. — *Make the causes one couplet and the effects the other, arranging the terms in the same order, and representing the required term by x.*

If the required term is in the means, divide the product of the extremes by the product of the given factors in the means.

If the required term is in the extremes, divide the product of the means by the product of the given factors in the extremes.

Note. The solution is much shortened by the use of cancellation.

PARTNERSHIP.

348. **A Partnership** is an association of two or more persons for the transaction of business.

349. **The Partners** are the persons associated in business.

350. **The Capital** is the money or property invested in the business.

351. **The Resources, or Assets,** of a firm are its property of all kinds together with the amounts due it.

352. **The Liabilities** of a firm are its debts.

353. **To find the partners' gain or loss when their capital is employed for equal periods of time.**

Rule. — *Take such a part of the whole gain or loss as each partner's capital is of the whole capital.*

354. To find the partners' gain or loss when their capital is employed for unequal periods of time.

RULE. — *Take such a part of the whole gain or loss as each partner's capital for one month is of the whole capital for one month.*

INVOLUTION.

355. A Power of a number is the result obtained by taking the number any number of times as a factor.

356. The First Power of a number is the number itself.

357. The Square of a number is its second power.

358. The Cube of a number is its third power.

359. An Exponent is a figure written at the right of a number, and a little above it, to denote how many times it is taken as a factor.

360. Involution is the process of finding any power of a number.

361. To find any power of a number.

RULE. — *Use the number as a factor as many times as there are units in the exponent.*

EVOLUTION.

362. A Root of a number is one of its equal factors.

363. The Square Root of a number is one of its two equal factors.

364. The Cube Root of a number is one of its three equal factors.

365. A Perfect Power is a number whose root can be found.

366. **An Imperfect Power** is a number whose root can not be found.

367. **Evolution** is the process of finding any root of a number.

368. **Evolution** is indicated by the radical sign, $\sqrt{}$, which is placed before and over the number, or by a fractional exponent.

369. **The Index** of a root is a small figure written in the opening of the sign to indicate what root is required.

370. When a fractional exponent is used, the numerator indicates the power of the number and the denominator the root of that power.

371. To find the square root of a whole number.

Rule. — *Separate the number into periods of two figures each, beginning with units.*

Find the greatest square in the left-hand period, and write its square root for the first figure of the root.

Subtract this square from the left-hand period, and to the remainder annex the next period for a dividend.

Double the root already found for a partial divisor. Divide the dividend, omitting the right-hand figure, by the partial divisor and annex the quotient to the root and also to the divisor. Multiply the completed divisor by the last figure in the root, subtract the product from the dividend, and to the remainder annex the next period for the next dividend.

Proceed in the same manner until all the periods have been used.

Note 1. If the number is not a perfect power, annex periods of ciphers to the last remainder and continue the process. The figures thus obtained will be decimals.

Note 2. If any partial divisor is not contained in the dividend, annex a cipher both to the root and to the divisor, and annex the next period to the dividend.

NOTE 3. The right-hand period of whole numbers may have but one figure.

372. To find the square root of a decimal.

RULE. — *Separate the decimal into periods of two figures each, beginning at the decimal point. The process is the same as in whole numbers.*

From the right of the root point off as many decimal places as there are periods of decimal places in the decimal.

NOTE. Each period of a decimal must have two figures. Hence, if the number of decimal places is odd, a cipher must be annexed to complete the right-hand period.

373. To find the square root of a common fraction.

RULE. — *Reduce the fraction to its lowest terms, and find the square root of each term separately.*

NOTE. If either term is not a square, reduce the fraction to a decimal and find the square root of the decimal.

374. To find the cube root of a whole number.

RULE. — *Separate the number into periods of three figures each, beginning with units.*

Find the greatest cube in the left-hand period, and write its cube root for the first figure of the root.

Subtract this cube from the left-hand period, and to the remainder annex the next period for a dividend.

Square the root already found, multiply the square by 3, and to the product annex two ciphers for a partial divisor.

Divide the dividend by the partial divisor, and annex the quotient to the root.

Multiply the first part of the root by the second part and that product by 3, and to the result annex one cipher. Add this number and the square of the second part of the root to the partial divisor for the complete divisor.

Multiply the complete divisor by the second part of the root, and subtract the product from the dividend.

Proceed in the same manner until all the periods have been used.

Each partial divisor after the first is more easily found by adding to the last preceding complete divisor the first part of the correction and twice the second part and annexing two ciphers to the result.

NOTE 1. If the number is not a perfect power, annex periods of ciphers to the last remainder and continue the process. The figures thus obtained will be decimals.

NOTE 2. If any partial divisor is not contained in the dividend, annex one cipher to the root, annex two ciphers to the partial divisor, and annex the next period to the dividend.

NOTE 3. The right-hand period of whole numbers may have only one or two figures.

375. To find the cube root of a decimal.

RULE. — *Separate the decimal into periods of three figures each, beginning at the decimal point. The process is the same as in whole numbers.*

From the right of the root point off as many decimal places as there are periods of decimal places in the decimal.

NOTE. Each period of a decimal must have three figures. Hence, if there is a partial period at the right, one or two ciphers must be annexed.

376. To find the cube root of a common fraction.

RULE. — *Reduce the fraction to its lowest terms, and find the cube root of each term separately.*

NOTE. If either term is not a cube, reduce the common fraction to a decimal and find the cube root of the decimal.

MENSURATION.

377. Mensuration treats of the measurement of lines, surfaces, and solids.

378. **A Line** is that which has length only.

379. **A Straight Line** is a line that does not change its direction.

380. **A Curved Line** is a line that changes its direction at every point.

381. **Parallel Lines** are lines that are everywhere equally distant from each other.

382. **A Horizontal Line** is a line that is parallel to the horizon or water level.

383. **A Vertical Line** is a line that points toward the center of the earth.

384. **An Angle** is the opening between two lines drawn from the same point.

385. **The Vertex** of an angle is the point where the two sides of the angle meet.

386. **A Perpendicular Line** is a straight line that meets another line making the two angles equal.

387. **A Right Angle** is an angle formed by two lines that are perpendicular to each other.

388. **An Acute Angle** is an angle that is smaller than a right angle.

389. **An Obtuse Angle** is an angle that is larger than a right angle.

SURFACES.

390. **A Surface** is that which has length and breadth but no thickness.

391. **A Plane Surface** is a surface that does not change *its direction*.

392. A Curved Surface is a surface that changes its direction.

393. A Plane Figure is a portion of a plane surface bounded by straight or curved lines.

394. A Polygon is a plane figure bounded by three or more straight lines.

395. The Perimeter of a polygon is the sum of its sides.

396. A Triangle is a plane figure bounded by three straight lines.

397. The Dimensions of a triangle are its base and altitude.

398. The Base of a triangle is the side on which it is supposed to stand.

399. The Vertical Angle of a triangle is the angle opposite the base.

400. The Altitude of a triangle is the perpendicular distance from the vertex of the vertical angle to the base, or to the base prolonged.

401. An Equilateral Triangle is a triangle which has the three sides equal.

402. An Isosceles Triangle is a triangle which has two of its sides equal.

403. A Scalene Triangle is a triangle which has no two sides equal.

404. An Equiangular Triangle is a triangle which has the three angles equal.

405. A Right Triangle is a triangle which has one right angle.

406. An Obtuse Triangle is a triangle which has one obtuse angle.

407. **An Acute Triangle** is a triangle in which the three angles are acute.

408. **The Hypotenuse** of a right triangle is the side opposite the right angle.

409. **A Quadrilateral** is a plane figure bounded by four straight lines.

410. **A Trapezium** is a quadrilateral which has no two sides parallel.

411. **A Trapezoid** is a quadrilateral which has two sides parallel.

412. **A Parallelogram** is a quadrilateral whose opposite sides are parallel.

413. **A Rectangle** is a parallelogram whose angles are right angles.

414. **The Dimensions** of a rectangle are its length and breadth.

415. **A Square** is an equilateral rectangle.

416. **A Square Inch** is a square one inch on each side.

417. **A Square Foot** is a square one foot on each side.

418. **A Rhomboid** is a parallelogram whose angles are not right angles.

419. **A Rhombus** is an equilateral rhomboid.

420. **The Diagonal** of a plane figure is a straight line joining the vertices of two angles not adjacent.

421. **The Area** of any surface is the number of square units it contains.

422. To find the hypotenuse of a right triangle when the other two sides are given.

RULE.—*Square the two sides about the right angle, add the squares, and find the square root of the sum.*

423. To find either side about the right angle.

RULE. — *Square the hypotenuse and the given side, subtract the smaller square from the larger, and find the square root of the difference.*

424. To find the dimensions of a square when the area is given.

RULE. — *Find the square root of the area.*

NOTE. The area must be expressed in units less than acres.

425. To find the dimensions of a cube when the volume is given.

RULE. — *Find the cube root of the volume.*

NOTE. The volume must be expressed in cubic units, not in cords, bushels, or gallons.

426. To find the diagonal of a square when the area is given.

RULE. — *Multiply the area by 2 and find the square root of the product.*

427. To find the diagonal distance through a cube or rectangular solid.

RULE. — *Square the three dimensions, add the three squares, and find the square root of their sum.*

428. To find the area of a triangle when the base and altitude are given.

RULE. — *Multiply the base by the altitude and divide the product by 2.*

RULE. — *Multiply one dimension by half the other.*

429. To find one dimension of a triangle when the area and other dimension are given.

RULE. — *Divide the area by half the given dimension.*

430. To find the area of a triangle when the three sides are given.

RULE. — *Find half the sum of the three sides; from this half sum subtract each side separately, find the product of the half sum and the three remainders, and extract its square root.*

431. To find the area of a trapezoid.

RULE. — *Multiply half the sum of the parallel sides by the altitude.*

432. To find the area of a trapezium.

RULE. — *Multiply the diagonal by half the sum of the perpendiculars drawn to it from the vertices of the opposite angles.*

CIRCLES.

433. A Circle is a plane figure bounded by a curved line every point of which is equally distant from a point within called the center.

434. The Circumference of a circle is the line which bounds it.

435. The Diameter of a circle is a straight line drawn through the center and terminating at both ends in the circumference.

436. The Radius of a circle is a straight line drawn from the center to the circumference.

437. An Inscribed Square is a square formed in a circle and having the vertices of its angles in the circumference.

438. A Circumscribed Square is a square formed about a circle, each side of the square touching the circumference in one point.

439. To find the circumference of a circle when the diameter is given.

RULE. — *Multiply the diameter by 3.1416.*

440. To find the diameter of a circle when the circumference is given.

RULE. — *Divide the circumference by 3.1416.*

441. To find the area of a circle.

RULE. — *Multiply the circumference by one-half the radius or one-fourth the diameter.*

RULE. — *Multiply the square of the diameter by .7854.*

442. To find the side of an inscribed square.

RULE. — *Square the diameter, divide the square by 2, and extract the square root of the quotient.*

PRISMS AND CYLINDERS.

443. A Solid is that which has length, breadth, and thickness.

444. A Rectangular Solid is a solid bounded by six rectangular faces.

445. The Dimensions of a rectangular solid are the length, breadth, and thickness.

446. A Cube is a solid bounded by six equal squares called faces.

447. A Cubic Inch is a cube each face of which is one square inch.

448. A Cubic Foot is a cube each face of which is one square foot.

449. A Prism is a solid whose ends are similar, equal, and parallel polygons and whose sides are parallelograms.

450. A Square Prism is a prism whose ends are squares.

451. A Triangular Prism is a prism whose ends are triangles.

452. A Cylinder is a solid bounded by a uniformly curved surface, the ends being equal and parallel circles.

453. The Altitude of a prism or cylinder is the perpendicular distance between its ends.

454. The Convex Surface of a prism or cylinder is all its surface except that of the ends.

455. The Volume of any solid is the number of cubic units it contains.

456. To find the convex surface of a prism or cylinder.

RULE. — *Multiply the perimeter of the base by the altitude.*

457. To find the volume of a prism or cylinder.

RULE. — *Multiply the area of the base by the altitude.*

PYRAMIDS AND CONES.

458. A Pyramid is a solid whose base is a polygon and whose faces are triangles, which meet at a common point called the vertex.

459. A Square Pyramid is a pyramid whose base is a square.

460. A Triangular Pyramid is a pyramid whose base is a triangle.

461. A Cone is a solid whose base is a circle and whose surface tapers uniformly to a point called the vertex.

462. The Altitude of a pyramid or cone is the perpendicular distance from the vertex to the plane of the base.

463. **The Slant Height** of a pyramid or cone is the perpendicular distance from the vertex to the perimeter of the base.

464. To find the convex surface of a pyramid or cone.

RULE. — *Multiply the perimeter of the base by half the slant height.*

465. To find the volume of a pyramid or cone.

RULE. — *Multiply the area of the base by one-third the altitude.*

SPHERES.

466. A Sphere is a solid bounded by a uniformly curved surface, all points of which are equally distant from a point within called the center.

467. The Diameter of a sphere is a straight line passing through the center and terminating at both ends in the surface.

468. The Radius of a sphere is half the diameter.

469. The Circumference of a sphere is the greatest distance around it.

470. To find the surface of a sphere.

RULE. — *Multiply the circumference by the diameter.*

RULE. — *Multiply the square of the diameter by 3.1416.*

471. To find the volume of a sphere.

RULE. — *Multiply the surface by one-sixth the diameter.*

LONGITUDE AND TIME.

472. A Meridian Circle is an imaginary line passing around the earth through both poles.

473. Longitude is distance east or west from a given meridian. The meridians from which longitude is generally reckoned are those that pass through Washington, D. C., and Greenwich, England. If a place is east of the given meridian, it is in east longitude; and if it is west of the given meridian, it is in west longitude.

474. The earth rotates on its axis once in 24 hours. The rotation of the earth on its axis causes the sun to appear to move around the earth, and the relative position of the sun to any meridian determines the time of all places on that meridian. When the rays of the sun are vertical at any point of a meridian, it is noon at all places on that meridian that are lighted by the sun. Since the sun appears to move around the earth from east to west, when it is noon on any meridian, it is past noon at all places east of that meridian and before noon at all places west of that meridian. The sun appears to move around the earth once in 24 hours. All circles are divided into 360 degrees, hence the sun appears to move through 360 degrees in 24 hours. Since this apparent motion is uniform, a difference of time between two places of:

1 hr. is due to a difference of 15° of longitude.
1 min. " " " 15′ " "
1 sec. " " " 15″ " "

475. To find the difference of longitude between two places.

RULE. — *If both places are in east or west longitude, subtract the less from the greater. If one place is in east and the other in west longitude, add the longitude of the two places.*

NOTE. If, in the latter case, the sum is greater than 180 degrees, subtract it from 360 degrees.

476. To find the time at one place when the time at another place and their difference of time are given.

RULE. — *If the time of the easterly place is required, add the difference of time to the time of the westerly place. If the time of the westerly place is required. subtract the difference of time from the time of the easterly place.*

477. To find the difference in longitude between two places when the difference in time is given.

RULE. — *Multiply the difference of time, expressed in hours, minutes, and seconds by 15, and the respective products will express the number of degrees, minutes, and seconds in the difference of longitude.*

478. To find the difference in time between two places when the difference in longitude is given.

RULE. — *Divide the difference of longitude, expressed in degrees, minutes, and seconds, by 15, and the respective quotients will express the number of hours, minutes, and seconds in the difference of time.*

METRIC SYSTEM.

479. The Metric System is a system of weights and measures whose units increase and decrease on the decimal scale. It is called the metric system, because the unit is the meter, all the units of length, surface, volume, capacity, and weight being derived from it.

480. The unit of length is the meter.

10 **millimeters** $^{(\text{mm})}$ = 1 **centimeter** $^{(\text{cm})}$.
10 centimeters = 1 decimeter $^{(\text{dm})}$.
10 decimeters = 1 **meter** $^{(\text{m})}$.
10 meters = 1 dekameter $^{(\text{Dm})}$.
10 dekameters = 1 hektometer $^{(\text{Hm})}$.
10 hektometers = 1 **kilometer** $^{(\text{Km})}$.
10 kilometers = 1 myriameter $^{(\text{Mm})}$.

481. The units of surface are squares whose dimensions are the corresponding units of length, hence it takes 100 of one denomination to make one of the next higher.

100 square millimeters (sq mm) = 1 **square centimeter** (sq cm).
100 square centimeters = 1 square decimeter (sq dm).
100 square decimeters = 1 **square meter** (sq m).
100 square meters = 1 square dekameter (sq Dm).
100 square dekameters = 1 square hektometer (sq Hm).
100 square hektometers = 1 **square kilometer** (sq Km).

482. The *centare* (ca) is the same as the square meter.

483. The *are* (a) is the same as the square dekameter.

484. The *hectare* (Ha) is the same as the square hektometer.

These names are given to these units when they are used in measuring land.

485. The units of volume are cubes whose dimensions are the corresponding units of length, hence it takes 1000 of one denomination to make one of the next higher.

1000 cubic millimeters (cu mm) = 1 **cubic centimeter** (cu cm).
1000 cubic centimeters = 1 cubic decimeter (cu dm).
1000 cubic decimeters = 1 **cubic meter** (cu m).

486. The *stere* (st) is the same as the cubic meter.

487. The *decistere* (dst) is the same as 100 cubic decimeters.

488. The *dekastere* (Dst) is the same as 10 cubic meters.

489. The unit of capacity is the liter, which is equal to a cubic decimeter.

10 milliliters (ml) = 1 **centiliter** (cl).
10 centiliters = 1 deciliter (dl).
10 deciliters = 1 **liter** (l).
10 liters = 1 dekaliter (Dl).
10 dekaliters = 1 **hektoliter** (Hl).
10 hektoliters = 1 kiloliter (Kl).

490. The unit of weight is the gram, which is equal to the weight of a cubic centimeter of distilled water at its greatest density.

10 **milligrams** $^{(mg)}$ = 1 **centigram** $^{(cg)}$.
10 centigrams = 1 decigram $^{(dg)}$.
10 decigrams = 1 **gram** $^{(g)}$.
10 grams = 1 dekagram $^{(Dg)}$.
10 dekagrams = 1 hektogram $^{(Hg)}$.
10 hektograms = 1 **kilogram** $^{(Kg)}$ or **kilo** $^{(K)}$.
10 kilograms = 1 myriagram $^{(Mg)}$.
10 myriagrams = 1 quintal $^{(Q)}$.
10 quintals = 1 ton $^{(T)}$.

491. A cubic centimeter of water weighs a gram.

492. A cubic decimeter of water weighs a kilogram.

493. A liter of water weighs a kilogram.

494. A cubic meter of water weighs a ton.

495. A kiloliter of water weighs a ton.

496. EQUIVALENTS.

1 meter = 39.37 inches.
1 kilometer = .62138 mile.
1 square meter = 1550 square inches.
1 hectare = 2.4714 acres.
1 cubic meter = 1.308 cubic yards.
1 stere = .2759 cord.
1 liter = 61.022 cubic inches.
1 liter = 1.0567 liquid quarts.
1 liter = .9081 dry quarts.
1 gram = 15.432 grains.
1 kilogram = 2.2046 pounds Av.

To THE TEACHER. — Show pupils that reduction ascending and reduction descending in the metric system are performed by moving the decimal point, to the right in reduction descending and to the left in reduction ascending. In linear measures, measures of capacity, and weight, the decimal point is moved one place. In surface measures the decimal point is moved two places. In volume measures the decimal point is moved three places. Show also that all operations with metric numbers are performed like similar operations in decimals. Give examples in the various tables in reduction ascending and descending, addition, subtraction, multiplication, and division.

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